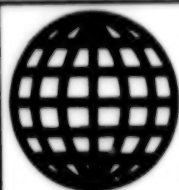


JPRS-ULS-90-013  
26 JULY 1990



**FOREIGN  
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# ***JPRS Report***

# **Science & Technology**

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***USSR: Life Sciences***

# Science & Technology

## USSR: Life Sciences

JPRS-ULS-90-013

### CONTENTS

26 July 1990

#### AEROSPACE MEDICINE

Ferrocene Test for Calculating Body Iron Reserves [T. A. Orlova and R. K. Kiseleva; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	1
Long-Term Effects of Accelerated Carbon Ions on Cerebellar Cortex Ultrastructure in Rats [L. B. Verbitskaya, B. S. Fedorenko, et al.; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	1
Effects of Active Vitamin D <sub>3</sub> Metabolites on Rat Bone in Various Experimental Models of Hypokinesia [M. S. Belakovskiy and M. S. Khaydakov; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	1
Effects of Hydroxydimethylaminopropylidene Bisphosphonate on Bony Tissue in Hypokinetic Rats [V. N. Shvets, A. S. Pankova, et al.; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	1
Morphological Examination of Rat Adrenal Glands Following Flight Aboard Biosputnik Kosmos-1667 [N. G. Prodan and V. Baranska; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	2
Central and Regional Hemodynamics in Prolonged Space Flights [V. F. Turchaninova, A. D. Yegorov, et al.; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	2
Protective Functions of Skin [O. V. Ignatova, A. A. Berlin, et al.; <i>KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA</i> , Vol 23 No 6, Nov-Dec 89]	2

#### AGRICULTURAL SCIENCE

Characteristics of Individual Elements of Spring Wheat Production Process as Indices of Induced Elevation of Heat Resistance [L. A. Ignatyev, F. R. Kalimullina, et al.; <i>FIZIOLOGIYA I BIOKHIMIYA KULTURNYKH RASTENIY</i> , Vol 21 No 2, 89]	3
Production and Description of H. Vulgare x T. Timopheevi Zhuk. Hybrids and Their Progeny [L. A. Pershina, O. M. Numerova, et al.; <i>TSITOLOGIYA I GENETIKA</i> , Vol 24 No 2, Mar-Apr 90]	3
Plant Regeneration from Isolated Brassica Protoplasts [L. A. Sakhno and M. V. Skarzhinskaya; <i>FIZIOLOGIYA RASTENIY</i> , Vol 37 No 1, Jan 90]	3
Modifiers of Mutation Induction Incidence in Barley [M. R. Kozachenko and V. T. Manzyuk; <i>TSITOLOGIYA I GENETIKA</i> , Vol 24 No 1, Jan-Feb 90]	3
Nematophagic Characteristics of Biopreparation of Predacious Fungi Obtained by Experimental Industrial Method [N. V. Matskevich, V. S. Kosovets, et al.; <i>MIKOLOGIYA I FITOPATOLOGIYA</i> , Vol 24 No 1, Jan-Feb 90]	3
Dalnevostochnaya-10 Spring Wheat [I. M. Shindin and G. S. Karacheva; <i>SELEKTSIYA I SEMENOVODSTVO</i> , No 6, Nov-Dec 89]	4
Mutant 428 Rice Variety [N. Ya. Nekrasov and V. M. Sudin; <i>SELEKTSIYA I SEMENOVODSTVO</i> , No 6, Nov-Dec 89]	4

#### BIOCHEMISTRY

Stereochemistry of D-Orn <sup>2</sup> Cyclic Analogs of Enkephalin in Dimethylsulfoxide Solution [M. D. Shenderovich, Yu. B. Saulitis, et al.; <i>BIOORGANICHESKAYA KHIMIYA</i> , Vol 16 No 1, Jan 90]	5
Mechanism for Inhibiting Erythrocytic Acetylcholinesterase Activity With Some Photodynamic Herbicides [F. I. Braginskaya, O. M. Zorina, et al.; <i>IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA</i> , No 1, Jan-Feb 90]	5

Stability of Biocatalysts of Carrageenan-Immobilized Escherichia Coli Cells in System for Continuous L-Malic Acid Synthesis [A. N. Verevkin and V. I. Yakovleva; PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA, Vol 26 No 1, Jan-Feb 90] .....	5
Hydroxylation of Indolyl-3-Acetic Acid by Aspergillus Niger IBFM F-212 Immobilized in Calcium Alginate and Carrageenan [T. G. Baklashova, K. A. Koshcheyenko, et al.; PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA, Vol 26 No 1, Jan-Feb 90] .....	5
Some Properties of Immobilized Terminal Deoxynucleotidyltransferase From Cattle Thymus [A. G. Akishev; PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA, Vol 26 No 1, Jan-Feb 90] .....	6
Antigenic Structure of Bacillus Thuringiensis Endotoxins [V. Ya. Yagudin and A. S. Krylov; PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA, Vol 26 No 1, Jan-Feb 90] .....	6

## BIOTECHNOLOGY

Attempts at Incorporation of Exogenous DNA and Other Macromolecules into Mouse Spermatozoa by Liposomal and Calcium Phosphate Coprecipitation Methods [V. S. Baranov, B. Brzobogaty, et al.; TSITOLOGIYA I GENETIKA, Vol 24 No 2, Mar-Apr 90] .....	7
Construction and Description of Recombinant Plasmid pOV13 as DNA Cloning Vector with Broad Bacterial Host Range [V. I. Zakharenko, V. N. Gorelov, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 12, Dec 89] .....	7
Cloning and Structural Analysis of cDNA for Human Prointerleukin-1A and Prointerleukin-1B [S. V. Kotenko, M. T. Bulenkov, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 12, Dec 89] .....	7

## EPIDEMIOLOGY

Serologic Surveillance of Diphtheria Immunity [D. Ya. Kasimova, V. Yu. Kryukov, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 11, Nov 89] .....	8
Elimination of Brucellosis in Krasnodar Kray [Ye. Ya. Nazarov, T. V. Yarov, et al.; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 11, Nov 89] .....	8
Shigellosis in USSR: Etiologic Significance of Shigella Dysenteriae [Yu. P. Solodovnikov; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 11, Nov 89] .....	8
Clinical Features of Tick Borne Encephalitis in Crimea [M. A. Borisova, S. Ya. Markeshin, et al.; KLINICHESKAYA MEDITSINA, Vol 67 No 12, Dec 89] .....	8

## GENETICS

Phage Vector EMBL-3-Based Barley Nuclear Genome Library [A. G. Artyushevskiy and I. D. Volotovskiy; IZVESTIYA AKADEMII NAUK BSSR: SERIYA BIOLOGICHESKIKH NAUK, No 1, Jan-Feb 90] .....	9
New Broad Host-Range Plasmid pBS1001 [A. N. Dubeykovskiy, T. Z. Yesikova, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 11, Nov 89] .....	9
Pseudomonas Putida Plasmid Degradation of Biphenyl, Chlorobiphenyls, and m-Toluylate [A. L. Ardreyaeva, S. A. Selifonov, et al.; MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA, No 11, Nov 89] .....	9

## IMMUNOLOGY

Effects of Synthetic Thymus Peptide (Thymogen) on Immune System in Candidiasis in Immunosuppression [O. K. Khmel'nitskiy, G. M. Yakovlev, et al.; ARKHIV PATOLOGII, Vol 52 No 1, Jan 90] .....	10
Assessment of Therapeutic Effectiveness of Gene-Engineered Human A <sub>2</sub> -Interferon in Acute Viral Hepatitis B Patients [V. I. Pokrovskiy, A. V. Zmyzgova, et al.; TERAPEVTICHESKIY ARKHIV, Vol 62 No 2, Feb 90] .....	10

Clinical and Immunologic Aspects of Erysipelas in Heavy Industry Workers and Therapeutic Effect of Recombinant Interferon [N. A. Peresadin, Yu. G. Pustovoy, et al.; SOVETSKAYA MEDITSINA, No 1, Jan 90]	10
Tactivin Therapy in Children with Acute Nonlymphoid Leukemia [T. S. Drozdova, L. A. Makhonova, et al.; GEMATOLOGIYA I TRANSFUZIOLOGIYA, Vol 35 No 1, Jan 90]	10
Mitogenic Activity of Glycopolymers of Clavibacter (Corynebacterium) Michiganense and Pseudomonas Solanacearum [L. D. Varbanets, S. L. Rybalko, et al.; MIKROBIOLOGICHESKIY ZHURNAL, Vol 51 No 6, Nov-Dec 89]	11
Entrapment of Intact Bacteria in Erythrocytes [T. P. Gening and T. F. Shevchenko; ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII, No 11, Nov 89]	11
Immunostimulation by Neurotensin, Pentagastrin and Thymopentin [G. A. Belokrylov, I. V. Molchanova, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY, Vol 108 No 11, Nov 89]	11
Enhancement of Phagocytosis by Fibronectin Tripeptide [G. A. Yermolin, S. N. Turishchev, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY, Vol 108 No 11, Nov 89]	11

## LASER BIOEFFECTS

Laser Treatment of Atherosclerosis [A. Gatilov; MEDITSINSKAYA GAZETA, 6 Oct 89]	13
Intravascular Laser Treatment of Atherosclerosis [Yu. S. Petrosyan, N. N. Kipshidze, et al.; VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR, No 12, Dec 89]	13
Effects of Laser Irradiation on Histophysiology of Basophils in Cerebral Dura Mater [V. M. Chertok, A. Ye. Kotsyuba, et al.; BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY, Vol 108 No 10, Oct 89]	13

## MARINE MAMMALS

Sleep and Wakefulness in Harp Seal Pups [O. I. Lyamin, A. I. Oleksenko, et al.; ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA, Vol 39 No 6, Nov-Dec 89]	14
---	----

## MEDICINE

Scintillator-Photodiode Detector for Medical X-Ray Computer Tomography [V. V. Konkov, A. G. Turyanskiy, et al.; MEDITSINSKAYA TEKHNIKA, No 1, Jan 90]	15
Clinical Benefit of Transfusion of UV-Irradiated Autologous Blood in Treating AIDS Patients [N. A. Dvaladze, V. A. Belokurov, et al.; VESTNIK KHIRURGII IMENI I. I. GREKOVA, Vol 144 No 1, Jan 90]	15
Plasma Scalpel in Lung Surgery [G. I. Lukomskiy, I. V. Stupin, et al.; GRUDNAYA I SERDECHNO-SOSUDISTAYA KHIRURGIYA, No 2, Feb 90]	15
System of Automated Diagnosis of Cerebrovascular Diseases for Preventive Examinations of Public [V. D. Troshin and Yu. G. Vasin; ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA, Vol 90 No 1, Jan 90]	15
Cryopreservation of Large Volumes of Erythrocytes Using Polyethyleneoxide-1500 [A. N. Novikov, S. T. Oleynik, et al.; KRIOBIOLOGIYA, No 1, Jan-Mar 90]	16
Detoxication in Critical Rhabdomyolysis [R. I. Novikova, V. P. Shano, et al.; VESTNIK KHIRURGII IMENI I. I. GREKOVA, Vol 143 No 10, Oct 89]	16
Effects of Plasma Substitute Oxyamal on Water and Acid-Base Balance in Blood During Infusions [Yu. A. Litvinenko, I. R. Kolonina, et al.; GEMATOLOGIYA I TRANSFUZIOLOGIYA, Vol 34 No 12, Dec 89]	16
Effects of Intravenous Administration of Ultradispersed Ferromagnetic Particles on Blood Morphology and Function [V. A. Volkonskiy; GEMATOLOGIYA I TRANSFUZIOLOGIYA, Vol 34 No 12, Dec 89]	16

## MICROBIOLOGY

- Transfer of Plasmid pXO2 by Transduction and Conjugation in *Bacillus Anthracis*  
[A. S. Stepanov, O. B. Puzanova, et al.; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 12, Dec 89] ..... 18
- Synthesis of Cyclodextringlucanotransferase by Microorganisms That Use Cyclodextrins as Their Sole Source of Carbon  
[N. G. Usanov, O. N. Loginov, et al.; *DOKLADY AKADEMII NAUK SSSR*, Vol 310 No 6, Feb 90] ..... 18
- Effects of Culture Age and Cell Wall Composition on Conidial Adhesiveness of Polymer-Degrading Fungi  
[I. V. Kaznacheyev, K. Z. Gumargaliyeva, et al.; *MIKROBIOLOGICHESKIY ZHURNAL*, Vol 51 No 6, Nov-Dec 89] ..... 18
- Surfactant and Emulsifying Properties of *Candida Lipolytica* Y-917 Culture Grown on N-Hexadecane  
[O. Yu. Lesyk, Ye. V. Karpenko, et al.; *MIKROBIOLOGICHESKIY ZHURNAL*, Vol 51 No 6, Nov-Dec 89] ..... 18
- Changes in Glucose Metabolism During Strain 182-A Leaching of Manganese Ores  
[Yu. S. Babenko, L. P. Golodok, et al.; *MIKROBIOLOGICHESKIY ZHURNAL*, Vol 51 No 6, Nov-Dec 89] ..... 19
- Cryotransformation of *Bacillus Anthracis* by Plasmid pUB110 DNA  
[O. B. Puzanova, A. S. Stepanov, et al.; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 12, Dec 89] ..... 19
- Effects of  $Mg^{2+}$  Ions on Properties of Some Strains of *Yersinia Pestis*  
[M. I. Zarenkov, S. R. Sayamov, et al.; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 12, Dec 89] ..... 19
- Plasmid Screening in Differentiation of *Bacillus Anthracis* from Closely Related Species of Edaphic *Bacillus*  
[Yu. A. Akhmedzyanov, P. I. Naymanov, et al.; *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII*, No 11, Nov 89] ..... 19
- Inhibition of Antibacterial Activity of Mouse Peritoneal Macrophages by Combination of Staphylococcal Enterotoxin A and Endotoxin  
[Ye. V. Ryabichenko and Yu. V. Yezepchuk; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY*, Vol 108 No 11, Nov 89] ..... 19

## MOLECULAR BIOLOGY

- Cultivation Conditions and Function Analysis of Plasmid ColE1 Par-Loci  
[M. N. Kolot; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 11, Nov 89] ..... 21
- SsrI Class II Restriction Endonuclease from *Staphylococcus Saprophyticus*  
[V. S. Dedkov, G. G. Prikhodko, et al.; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 11, Nov 89] ..... 21
- Primary Structure of VP1 Protein Gene of Foot and Mouth Disease Virus Serotype Asia I  
[S. V. Sosnovtsev, A. M. Onishchenko, et al.; *MOLEKULARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA*, No 12, Dec 89] ..... 21
- Gene Library of Symbiotic Nitrogen-Fixing *Rhizobium Lupini*  
[A. G. Ivanushkin, G. N. Marchenko, et al.; *PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA*, Vol 26 No 1, Jan-Feb 90] ..... 21

## NONIONIZING RADIATION EFFECTS

- Endocrine Reactivity to Low-Frequency Continuous and Pulsed Electromagnetic Fields  
[Ye. A. Zagorskaya; *KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA*, Vol 23 No 6, Nov-Dec 89] ..... 22
- Mechanism of Biological Action of Localized Constant Magnetic Field  
[Ye. G. Aliyeva; *IZVESTIYA AKADEMII NAUK TADZHIKSKOY SSR: OTDELENIYE BIOLOGICHESKIKH NAUK*, No 2, Apr-Jun 89] ..... 22
- Effect of Single Exposure to 50 Hz Electromagnetic Field on Heart Function and Hemodynamics in Rabbits  
[T.P. Chitaya and K.Sh. Nadareyshvili; *IZVESTIYA AKADEMII NAUK GRUZINSKOY SSR: SERIYA BIOLOGICHESKAYA*, Vol 15 No 5, Sep-Oct 89] ..... 22
- Biologic Response to Electromagnetic Radiation of Radio-Frequency Range  
[Yu. P. Chukova; *DOKLADY AKADEMII NAUK SSSR*, Vol 311 No 2, Mar 90] ..... 22



## PHARMACOLOGY, TOXICOLOGY

- Preparation and Characteristics of Antibiotic-Bearing Liposomes  
[K. A. Rotov, V. P. Vasilyev, et al.; *MIKROBIOLOGICHESKIY ZHURNAL*, Vol 51 No 6, Nov-Dec 89] ..... 23
- Atranes: Possible Mechanisms of Their Effect on Ulcers  
[I. G. Kuznetsov, M. M. Rasulov, et al.; *IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA*, No 1, Jan-Feb 90] ..... 23
- Modification of Selective Binding of Muscarinic Antagonists to Brain Membranes in Trichlorfon Intoxication  
[M. B. Predtechenskiy, N. L. Yelayeva, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY*, Vol 108 No 10, Oct 89] ..... 23
- Synthetic Analogs of Enkephalins as Antiatherogenic Agents  
[G. K. Zoloyev, V. D. Slepishkin, et al.; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY*, Vol 108 No 10, Oct 89] ..... 23

## PHYSIOLOGY

- In Vitro Effects of Synthetic Analog of Endogenous Opioids of Dalargin on Rat Heart in Experimental Toxemia  
[S. B. Pashutin; *BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY*, Vol 108 No 11, Nov 89] ..... 25
- Human Thermoregulatory Response to Moderate Hypercapnia  
[L. N. Mukhamediyeva, V. P. Savina, et al.; *KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA*, Vol 23 No 6, Nov-Dec 89] ..... 25
- Effects of ACTH<sub>4-10</sub> On Some Forms of Adaptive Behavior in Mice of Various Genetic Groups  
[V. V. Voznesenskaya and I. I. Poletayeva; *ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA*, Vol 39 No 6, Nov-Dec 89] ..... 25
- Lateralized Effects of Arg-Vasopressin on Hypothalamic Self-Stimulation in Rats  
[G. A. Varetanyan, T. M. Makarova, et al.; *ZHURNAL VYSSHEY NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA*, Vol 39 No 6, Nov-Dec 89] ..... 25
- Effects of Hypokinesia on Transport Function of Thyroid Capillary Endothelium  
[L. I. Polyanskaya, G. A. Alimov, et al.; *KROVOOBRAZHENIYE*, Vol 22 No 5, Sep-Oct 89] ..... 26
- Changes in Serotonin Levels in Peripheral Tissues During Artificial Hypothermia and Hibernation  
[K. V. Svechnikov and N. K. Popova; *IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIKH NAUK*, No 3, Dec 89] ..... 26
- Changes in Vestibular Postural Responses Determined by Visual Feedback Information  
[B. N. Smetanin, K. Ye. Popov, et al.; *NEYROFIZIOLOGIYA*, Vol 22 No 1, Jan-Feb 90] ..... 26
- Autotransplantation of Adrenal Medulla into Cervical Neurovascular Fascicle. Part 1.  
[D. M. Golub, I. I. Novikov, et al.; *IZVESTIYA AKADEMII NAUK BSSR: SERIYA BIOLOGICHESKIKH NAUK*, No 1, Jan-Feb 90] ..... 26
- Regeneration of Rat Peripheral Nerves in Transcranial Electrostimulation of Opioid Structures in Brain  
[G. N. Akoyev, O. B. Ilinskiy, et al.; *NEYROFIZIOLOGIYA*, Vol 22 No 1, Jan-Feb 90] ..... 27

## PUBLIC HEALTH

- BAM Public Health Problems [A. Lebedev; *MEDITSINSKAYA GAZETA*, 13 Sep 89] ..... 28
- Drug Abuse of Pervitin and Ephedrine Derivatives  
[G. Lukacher, A. Vrublevskiy, et al.; *MEDITSINSKAYA GAZETA*, 13 Sep 89] ..... 28
- Health Ministry Collegium [MEDITSINSKAYA GAZETA, No 120 (4981), 6 Oct 8] ..... 28
- Mass Pesticide Poisoning [A. Vladimirtseva; *MEDITSINSKAYA GAZETA* 20 Sep 89] ..... 28
- Self-Financed Clinic Described  
[L. F. Zolotareva Interview; *MEDITSINSKAYA GAZETA*, No 120 (4981), 6 Oct 8] ..... 30
- Medical Construction Funds Not Assimilated [Yu. Ishmayev; *MEDITSINSKAYA GAZETA*, 8 Sep 89] ..... 30
- New Ambulatory Treatment System Discussed  
[N. P. Poddubnyy; *MEDITSINSKAYA GAZETA*, 6 Oct 89] ..... 30

## RADIATION BIOLOGY

- Small Doses of Ionizing Radiation and Inducible Reparation System  
[L. G. Dubinina, Z. I. Kurashova, et al.; *DOKLADY AKADEMII NAUK SSSR*, Vol 311 No 2, Mar 90] ..... 31

- Change in Number of Chromosomal Aberrations Induced by X-Ray Irradiation in Cells Affected by  
Fruglumin A  
[G. V. Kraskovskiy, A. A. Rakityanskaya, et al.; *DOKLADY AKADEMII NAUK BSSR*,  
Vol 34 No 4, Apr 90] ..... 31

## VIROLOGY

- Recovery of Recombinant Polioviruses from Poliomyelitis Patients  
[O. K. Kutitova, G. Yu. Lipskaya, et al.; *MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I  
VIRUSOLOGIYA*, No 11, Nov 89] ..... 32
- Liver Damage in AIDS Patients  
[A. G. Rakhmanova, V. K. Prigozhina, et al.; *KLINICHESKAYA MEDITSINA*,  
Vol 67 No 11, Nov 89] ..... 32
- Potential Means of Diagnosing and Treating AIDS With Low Molecular Weight Non-Peptide Substances  
That Specifically Block CD4 Lymphocyte Receptor and gp120 Virus Receptor  
[L. A. Piruzyan, I. Ye. Kovalev, et al.; *IZVESTIYA AKADEMII NAUK SSSR: SERIYA  
BIOLOGICHESKAYA*, No 1, Jan-Feb 90] ..... 32

UDC 629.78:612.015.31:546.72

**Ferrocene Test for Calculating Body Iron Reserves**

907C0484I Moscow KOSMICHESKAYA BIOLOGIYA  
I AVIAKOSMICHESKAYA MEDITSINA in Russian  
Vol 23 No 6, Nov-Dec 89 (manuscript received  
13 Oct 88) pp 77-81

[Article by T. A. Orlova and R. K. Kiseleva]

[Abstract] A noninvasive test has been developed for assessing body reserves of iron, which entails taking a ferrocene (0.04 g iron) tablet after breakfast and subsequent urinalysis for iron. The rationale is based on the fact that there is an inverse relation between body stores of iron and iron secretion in response to the load. Studies on 24 men 18-21 years old with normal daily activities demonstrated that the 24 h excretion rate was about 50 percent (20.8 mg) of the intake. Studies with the ferrocene test on males in antiorthostatic positions (50 days at -6° or 120 days at -4.5°) treated with erythropoiesis stimulants showed essentially similar iron excretion patterns in the early stages of the experiment. However, after 13 days in the 50-day study and after 65-75 days in the 120-day study iron utilization was seen to increase, a change that coincided with enhanced hemoglobin synthesis. Figures 1; tables 1; references 15: 13 Russian, 2 Western.

UDC 612.827.014.482.086.3

**Long-Term Effects of Accelerated Carbon Ions on Cerebellar Cortex Ultrastructure in Rats**

907C0484H Moscow KOSMICHESKAYA BIOLOGIYA  
I AVIAKOSMICHESKAYA MEDITSINA in Russian  
Vol 23 No 6, Nov-Dec 89 (manuscript received  
20 May 88) pp 71-77

[Article by L. B. Verbitskaya, B. S. Fedorenko and R. A. Kabitsyna]

[Abstract] An ultrastructural analysis was conducted on the long-term effects on the cerebellar cortex ultrastructure in mature male Wistar rats following exposure to 320 MeV/nucleon accelerated carbon ions. Examination of the cerebellar cortex 1, 3, and 6 months after irradiation with  $10^4$  particles/cm<sup>2</sup> showed that irradiation with carbon ions was much more damaging than 1 Gr gamma irradiation from a Co-60 source. After one month the dystrophic changes in the neural and glial cells were diffuse in nature and reversible in appearance. After 3 and 6 months the changes were seen to be focal, progressive and irreversible. Interestingly, ultrastructural pathology was not exacerbated in animals in which gamma irradiation was followed by subsequent irradiation with accelerated carbon ions. The response of the various cerebellar ultrastructure varied: Purkinje cells responded primarily with 'dark'-type changes, while surrounding Bergmann glial cells underwent 'pale'-type changes. Similarly, in the granular layer neural cells

showed 'pale' changes while the adjacent oligodendrocytes exhibited 'dark' changes. Accordingly, even low fluxes of charged particles were observed to involve progressive neuronal sequelae. Figures 4; references 2 (Russian).

UDC 616.71-008.9-092:612.017.1]-085.356:577.164.  
22]-036.8-07-092.9

**Effects of Active Vitamin D<sub>3</sub> Metabolites on Rat Bone in Various Experimental Models of Hypokinesia**

907C0484E Moscow KOSMICHESKAYA BIOLOGIYA  
I AVIAKOSMICHESKAYA MEDITSINA in Russian  
Vol 23 No 6, Nov-Dec 89 (manuscript received  
31 Aug 88) pp 36-39

[Article by M. S. Belakovskiy and M. S. Khaydakov]

[Abstract] A multifaceted study was conducted on 250-300 g male Wistar rats subjected to 6 weeks of hypokinesia designed to assess the corrective potential of active vitamin D<sub>3</sub> metabolites 1,25(OH)<sub>2</sub>D<sub>3</sub> and 24,25(OH)<sub>2</sub>D<sub>3</sub> in osseous tissue. Hypokinetic models consisting of immobilization in a cage and tail-suspension had variable effects on bone metabolism, blood PTH levels, and active calcium transport in the intestine. Oral administration of 1,25(OH)<sub>2</sub>D<sub>3</sub> (0.025 µg/day) or 24,25(OH)<sub>2</sub>D<sub>3</sub> (1.25 µg/day), or their combination, had no effect on body weight. In the suspension experiments the exogenous metabolites did not affect blood levels of phosphorus or calcium or calcium absorption in the intestinal tract, but blood PTH levels were reduced to control levels. In the hypokinetic control animals femoral examination revealed an equivalent density increase of the epiphysis and the diaphysis and calcium and phosphorus concentrations. Combined administration of 1,25(OH)<sub>2</sub>D<sub>3</sub> and 24,25(OH)<sub>2</sub>D<sub>3</sub> resulted in normocalcemia and enhanced calcium absorption in the intestine, greater than normal density in the proximal epiphyses, while the distal epiphysis and diaphysis were unaffected. In summary, 1,25(OH)<sub>2</sub>D<sub>3</sub> and 24,25(OH)<sub>2</sub>D<sub>3</sub> did not exhibit a systemic effect in the hypokinetic animals, but had a beneficial effect on those segments of the femoral bone that showed mineral depletion. Tables 3; references 18: 6 Russian, 12 Western.

UDC 612.751.1.06:612.766.2].014.46:  
[615.272.2:546.18

**Effects of Hydroxydimethylaminopropylidene Bisphosphonate on Bony Tissue in Hypokinetic Rats**

907C0484F Moscow KOSMICHESKAYA BIOLOGIYA  
I AVIAKOSMICHESKAYA MEDITSINA in Russian  
Vol 23 No 6, Nov-Dec 89 (manuscript received  
13 Sep 88) pp 39-42

[Article by V. N. Shvets, A. S. Pankova, M. D. Goldovskaya and Z. Ye. Vnukova]



[Abstract] The effects of hydroxydimethylaminopropylidene bisphosphonate on the tibia and lumbar vertebrae of 270 g male Wistar rats subjected to hypokinesia for 35 days were studied in an experiment in which the animals were treated subcutaneously with 0.01 mg/kg/day of hydroxydimethylaminopropylidene bisphosphonate during the entire period. Monitoring of the spongy bone revealed a biphasic response in control animals: 1) reduction in density during the first week of hypokinesia, and 2) an invariable low-density baseline thereafter. Administration of hydroxydimethylaminopropylidene bisphosphonate actually maintained near-normal bone density throughout the experiment. Animals pretreated with hydroxydimethylaminopropylidene bisphosphonate (5 mg/kg/day) for 10 days prior to hypokinesia showed a one and one-half to twofold increase in bone density during the 35 days, especially in the tibia. The data were interpreted to indicate that administration of hydroxydimethylaminopropylidene bisphosphonate during hypokinesia prevented onset of corticosteroidal osteoporosis. The presumed mechanism of action rested on accumulation of hydroxydimethylaminopropylidene bisphosphonate in the spongy component, resulting in firm binding of mineral components and retardation of resorptive mechanisms. Figures 2; references 14: 1 Russian, 13 Western.

UDC 629.78:611.45.018.1

#### **Morphological Examination of Rat Adrenal Glands Following Flight Aboard Biosputnik Kosmos-1667**

907C0484D Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 6, Nov-Dec 89 (manuscript received 1 Feb 89) pp 27-30

[Article by N. G. Prodan (USSR) and V. Baranska (Poland)]

[Abstract] Histological examinations were performed on the adrenal glands of seven male Wistar rats after a 7-day flight aboard biosputnik Kosmos-1667. The studies were conducted 4-8 h after landing to assess the effects of weightlessness. The weight of the gland and the volume of cortical and medullary tissue were not affected. The general architectonics of the gland were within normal limits, although the width of the zona glomerulosa was somewhat narrowed. In the zona glomerulosa the nuclei:cytoplasm ratio remained normal, although the cytoplasmic and nuclear volumes in the experimental animals were expanded ( $P < 0.05$ ). The ratio was increased to 45.05 from 35.36 ( $P < 0.05$ ) in the zona fasciculata due an increase in the nuclear volume from 114.60 to 139.97  $\mu\text{m}^3$  ( $P < 0.05$ ). The zona reticularis remained unaffected. The entire cortex was hyperemic, while the presence of numerous cytoplasmic vacuoles indicated lipid depletion. Increased vacuolization of medullary cells and diminished area of epinephrine- and norepinephrine-producing cells were interpreted to reflect 'gravitational' stress. The findings suggested diminished medullary function and attenuation of the sympathetic system during space flight. Tables 3; references 15: 14 Russian, 1 Western.

UDC 629.78:[612.13+612.17

#### **Central and Regional Hemodynamics in Prolonged Space Flights**

907C0484C Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 6, Nov-Dec 89 (manuscript received 12 Sep 88) pp 19-26

[Article by V. F. Turchaninova, A. D. Yegorov and M. V. Domracheva]

[Abstract] An analysis was conducted on changes in central and regional hemodynamics of cosmonauts during ten short-term (7 days) and nine long-term (65-237 days) on Salyut 6-Soyuz and Salyut 7-Soyuz space flights using tetrapolar rheography. Hemodynamic monitoring, in conjunction with stress-testing and negative pressure on the lower part of the body, demonstrated that under conditions of weightlessness the increase in the activity of the vasomotor center and enhanced adrenergic mechanisms was due to a major blood volume shift to the lower extremities from the cardiopulmonary compartment. In short-term flights the heart rate remained essentially unchanged, while the stroke volume and minute volume diminished by 8 and 13 percent, respectively. In long-term flights the heart rate increased slightly (from 60 to 66 beats/min), while the stroke and minute volumes remained unaltered. The hemodynamic changes were interpreted to reflect ongoing adaptation and adjustment to weightlessness, a process that has been demonstrated to function for at least 237 days. Figures 4; tables 1; references 20: 14 Russian, 6 Western.

UDC 629.78:612.795

#### **Protective Functions of Skin**

907C0484B Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 6, Nov-Dec 89 (manuscript received 16 Feb 88) pp 15-19

[Article by O. V. Ignatova, A. A. Berlin, Z. P. Pak and I. G. Popov]

[Abstract] A brief review is presented of changes in the protective functions of the skin under conditions of space flight. In general, confinement aboard space ships has been accompanied by loss of bactericidal properties and changes in the normal skin flora, changes that have been reported to persist for prolonged periods of time. It is generally accepted that the microclimatic conditions lead to functional changes in the skin that alter the normal pH, fatty acid, and amino acid profiles. The net change is a reduction in the bactericidal potency of the skin, and a change in the skin flora. Changes in the bacterial flora in themselves eliminate normal bacterial antagonism. Finally, morphologic changes in the epidermis further compromise the barrier function of the skin. References 36: 19 Russian, 17 Western.

UDC 58.036.1:633.111.1

**Characteristics of Individual Elements of Spring Wheat Production Process as Indices of Induced Elevation of Heat Resistance**

18402078 Kiev *FIZIOLOGIYA I BIOKHIMIYA KULTURNYKH RASTENIY* in Russian Vol 21 No 2, 89 (manuscript received 12 Jan 88), pp 172-177

[Article by L. A. Ignatyev, F. R. Kalimullina, Institute of Soil Science and Agrochemistry, Siberian Division, USSR Academy of Sciences]

[Abstract] The level of heat resistance induced in regionalization of varieties of grain crops depends on factors such as the dose and nature of heat exposure and the functional activity of the seeds, sprouts, and autotrophic plants. It is important to find the optimal combination of such factors for maximum heat resistance. This article presents an assessment of the level of heat resistance of spring wheat after test determinations of growth rate and other elements of the production process. The rate of accumulation of dry matter and total photosynthesis are found to be the most reliable indices of heat resistance. When recorded with changes in plant height over time, they can be used to evaluate plant status in determining conditions which optimize heat resistance. The results of the study confirm the increase in the resistance of individual processes to high temperatures from growth to photosynthesis to respiration and indicate the desirability of using photosynthetic productivity as an intermediate function in terms of sensitivity to high temperature, as well as the closely related increase in biomass, to evaluate the heat resistance of plants in induced heat resistance. Figures 2, references 16: 15 Russian, 1 Western.

UDC 631.523/581.167

**Production and Description of H. Vulgare x T. Timopheevi Zhuk. Hybrids and Their Progeny**

907C0601A Kiev *TSITOLOGIYA I GENETIKA* in Russian Vol 24 No 2, Mar-Apr 90 (manuscript received 25 May 88) pp 33-37

[Article by L. A. Pershina, O. M. Numerova, L. I. Belova, E. P. Devyatkina, and V. K. Shumnyy, Institute of Cytology and Genetics, Siberian Division, USSR Academy of Sciences, Novosibirsk]

[Abstract] Embryo culture methods were employed for the production of barley x wheat (*H. vulgare* x *T. timopheevi* zhuk.) hybrids that were capable of backcrossing with *T. timopheevi*, *T. aestivum* and rye (*S. cereale*.) The trigeneric  $F_2$  hybrids were uniformly viable but sterile; the morphologic traits of barley genome were suppressed. Plants regenerated from callus tissues of *H. vulgare* x *T. timopheevi* x *S. cereale* possessed 30 chromosomes identical with the parental hybrid genome, confirming the stability of the hybrid genome. Figures 2; references 15: 5 Russian, 10 Western.

UDC 581.143.5.683.2

**Plant Regeneration from Isolated Brassica Protoplasts**

907C0586A Moscow *FIZIOLOGIYA RASTENIY* in Russian Vol 37 No 1, Jan 90 (manuscript received 11 Apr 88; after revision 2 Mar 89) pp 188-192

[Article by L. A. Sakhno and M. V. Skarzhinskaya, Institute of Botany imeni N. G. Kholodnyy, Ukrainian Soviet Socialist Republic Academy of Sciences, Kiev]

[Abstract] Studies on plantlet regeneration from *Brassica napus* and *B. oleracea* protoplasts yielded excellent results with protoplasts derived from hypocotyles of 5-7 day old rootlets of etiolated shoots. During cultivation there was 80-85 percent viability of the protoplasts, with division favored on ShB media with high auxin levels. For induction of organogenesis, the callus colonies were transferred to ShB media with high concentrations of cytokinins. In general, the plantlet regeneration yield was around 30 percent. Figures 1; tables 1; references 19 (Western).

UDC 575.24:633.16

**Modifiers of Mutation Induction Incidence in Barley**

907C0586B Kiev *TSITOLOGIYA I GENETIKA* in Russian Vol 24 No 1, Jan-Feb 90 (manuscript received 30 May 88) pp 45-49

[Article by M. R. Kozachenko and V. T. Manzyuk, Ukrainian Scientific Research Institute of Plant Husbandry, Selection, and Genetics, Kharkov]

[Abstract] Studies with spring barley seeds MX-77-226-8 demonstrated that vacuum infiltration of 1.0 percent basic fuchsin, 0.1 percent auramine, and 0.6 percent carmine was effective in enhancing induced mutation frequencies 2.47- to 3.76-fold, employing ionizing radiation from a Cs-137 source (50 and 100 Gr) or chemical mutagens (0.02-0.03 percent NEU; 0.012 percent NMU). As a result, novel varieties of spring barley, designated Kharkov-91 and Kharkov-99, have been created that were found suitable for wide-scale selection testing. Tables 3; references 10: 9 Russian, 1 Western.

UDC 632.937.14

**Nematophagic Characteristics of Biopreparation of Predacious Fungi Obtained by Experimental Industrial Method**

907C0614A Leningrad *MIKOLOGIYA I FITOPATOLOGIYA* in Russian Vol 24 No 1, Jan-Feb 90 (manuscript received 25 Jun 84) pp 22-26

[Article by N. V. Matskevich, V. S. Kosovets, D. A. Iosseliani, D. A. Karapetyan, V. F. Prikhodko, V. B. Udalova, and T. V. Teplyakova, All-Union Scientific Research Institute of Environmental Protection and National Park Affairs, Moscow Oblast; All-Union Helminthology Institute imeni K. I. Skryabin, Moscow]

[Abstract] Biological methods of protecting plants from disease and pests have been developed employing microbiological techniques of using predacious fungi (helminthophages) on nematodes toxic to vegetables. The biopreparation was assessed based on laboratory and garden experiments on cucumber plants cultivated on a culmiferous-fimicolous compost. The activity of nematodes *Aphelenchus avenae*, *Panagrellus redivivus*, *Meloidogyne incognita acrita*, *Arthrobotrys oligospora* Fres. XIX 4/27, *A. globospora* 374, and *A. oligospora* from the Novosibirsk Oblast was manifest in 25-75 percent of the active cultures. The mother cultures of variety 374 and the Novosibirsk Oblast population of *A. oligospora* had about the same amount of predation with 100 rings, while the XIX 4/27 average amount of predation was 150-400 rings. The biopreparations obtained in the experimental and industrial situation on various organic substrates did not differ from those grown in the laboratory in the nematophagic properties. The average amount of predation of the biopreparation obtained in the experimental industrial device ranged from 100 to 620, with a maximum of 250-1200 trap rings in the field of vision of the microscope. In contrast, those grown in separate tanks averaged 70 to 445 rings, with a maximum of 800-1200 trap rings. All the plants had *Meloidogyne incognita acrita* 26 days after planting, with 36-40 galls per plant. Figures 1; references 17: 16 Russian, 1 Western.

UDC 633.111"321":631.526.32

#### **Dalnevostochnaya-10 Spring Wheat**

907C0536A Moscow SELEKTSIYA I  
SEMENOVODSTVO in Russian No 6, Nov-Dec 89 p 27

[Article by I. M. Shindin and G. S. Karacheva, cand agric. sciences, Far Eastern Scientific Research Institute of Agriculture]

[Abstract] Dalnevostochnaya-10 soft spring wheat was obtained by individual selection from second generation hybrids derived by crossing Monakinka and Acadia (Canada) varieties. Since 1985 it has been grown in the Amurskiy Oblast and zones I and III of the Khabarovsk Kray. Dalnevostochnaya-10 lends itself to intensive-type cultivation, yielding harvests of 2.25 tons/ha, with a range of 1.41 to 3.02 tons/ha. Because of its susceptibility to blight the seeds must be treated with vitavaks [sic] or baytan [sic], although the plants are relatively resistant to brown and stem rusts. In general, the protein content of the grain is 17.8 percent, and gluten content is 35.9 percent. Baking properties were assessed at grade 4.

UDC 633.18:631.526.32

#### **Mutant 428 Rice Variety**

907C0536B Moscow SELEKTSIYA I  
SEMENOVODSTVO in Russian No 6, Nov-Dec 89  
pp 27-28

[Article by N. Ya. Nekrasov, senior scientific fellow; V. M. Sudin, chief, Selection Department, Ukrainian Scientific Rice Research Station]

[Abstract] Mutant 428 represents a new variety of rice obtained by selection from a mutant population derived by treating seeds of Fanu x KVR-127 hybrids with 0.02 percent nitrosomethylurea at the Ukrainian Rice Institute. Since 1989, Mutant 428 has been cultivated at rice farms in the Kherson, Odessa and Crimean Oblasts in Ukraine. This variety mature in 112-117 days, some 8-10 days earlier than other varieties cultivated in Ukraine and, with a height of 80-90 cm, is about 10-12 cm shorter. The grain is high quality; the weight of 1000 grains is generally 31-32 g, approximately 1.5-2.0 g greater than that of other varieties commonly grown in Ukraine. Over the years test plots have yielded harvests ranging from 5.15 to 9.7 tons/ha, promising to significantly increase rice harvests in Ukraine.

UDC 547.964.4:577.175

**Stereochemistry of D-Orn<sup>2</sup> Cyclic Analogs of Enkephalin in Dimethylsulfoxide Solution**

907C0627A Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 16 No 1, Jan 90 (manuscript  
received 12 Apr 88) pp 21-33

[Article by M. D. Shenderovich, Yu. B. Saulitis, I. V. Bobrova, A. V. Puchina, N. A. Abissova, G. V. Niki-  
forovich and G. I. Chipens, Institute of Organic Syn-  
thesis, Latvian Soviet Socialist Republic Academy of  
Sciences, Riga]

[Abstract] Conventional stereochemical analysis of  
cyclo(2<sup>6</sup>->5)[D-Orn<sup>2</sup>, Pro<sup>5</sup>] enkephalin (CE1) and  
cyclo(2<sup>6</sup>->5)[D-Orn<sup>2</sup>, Leu<sup>5</sup>] enkephalin (CE2) in di-  
methylsulfoxide demonstrated that in the case of the major  
trans-isomer (Phe<sup>4</sup>-Pro<sup>5</sup> bond) the peptide backbone of  
CE1 corresponds to FD\*F\*AA conformation, and to  
FE\*D\*DF conformation in the case of the minor cis-  
isomer of CE1. Data on the less rigid analog CE2 were  
consistent with a FD\*C\*AA conformation. Biological  
testing of both analogs on mouse epididymus and guinea  
pig ileum demonstrated that their conformational char-  
acteristics are such that they behave as moderately  
selective agonists for  $\mu$ -receptors, but fail to bind to  
 $\delta$ -receptors. Figures 3; tables 5; references 24: 8 Russian,  
16 Western.

UDC 577.152.311+632.954+612.118.221.3

**Mechanism for Inhibiting Erythrocytic Acetylcholinesterase Activity With Some Photodynamic Herbicides**

907C0626A Moscow IZVESTIYA AKADEMII NAUK  
SSSR: SERIYA BIOLOGICHESKAYA in Russian  
No 1, Jan-Feb 90 (manuscript received 1 Mar 89)  
pp 39-44

[Article by F. I. Braginskaya, O. M. Zorina, N. R.  
Boroduk, and V. G. Kartsev, Chemical Physics Insti-  
tute, USSR Academy of Sciences, Moscow]

[Abstract] The action of herbicides such as  $\alpha, \alpha$ -dipyridyl,  
o-phenanthroline, and acepox on the ultrasound  
mechanical resistance of erythrocytes and the activity of  
membrane-bound acetylcholinesterase was studied. Sus-  
pensions of erythrocytes extracted from 3 ml of fresh  
blood were used following precipitation and washing  
with an isotonic solution of NaCl. acetylcholinesterase  
activity prior to and following treatment with the pre-  
parations was calculated potentiometrically. The eryth-  
rocytes were incubated with three preparations of pyridine  
derivatives -  $\alpha, \alpha$  dipyridyl, o-phenanthroline, and oxime-  
2- acetylpyridyl for 2 min. The rates of the mechanical  
rupture of cells during the ultrasound process prior to  
and following treatment with the herbicides that were  
calculated directly from the kinetic curves of ultrasound  
disintegration characterize the mechanical resistance of  
the erythrocyte membranes. These herbicides disturb the

mechanical resistance of the erythrocytes, probably due  
to absorption of the herbicide molecules in the lipid  
bilayer of the erythrocyte membrane, but it may also be  
due to the absorption of these cyclic compounds on the  
surface hydrophobic sections of the erythrocyte cells  
where the membrane-bound acetylcholinesterase that  
the herbicides inactivated are located. Acepox is less  
toxic than  $\alpha, \alpha$ -dipyridyl, which is less toxic than o-  
phenanthroline, regardless of the test subject (human,  
mouse, or Tetrahymena pyriformis), indicating the  
general molecular mechanisms of toxicity of these pre-  
parations for biological systems with varying levels of  
organization. The search continues for non- acetylcho-  
linesterase agents and agents that will reverse the inhibi-  
tion that occurs when an organism is exposed to anti-  
acetylcholinesterase agents. Figures 2; tables 1;  
references 16: 8 Russian, 8 Western.

UDC 577.15.062:577.158.422

**Stability of Biocatalysts of Carrageenan-Immobilized Escherichia Coli Cells in System for Continuous L-Malic Acid Synthesis**

907C0630A Moscow PRIKLADNAYA BIOKHIMIYA I  
MIKROBIOLOGIYA in Russian Vol 26 No 1,  
Jan-Feb 90 (manuscript received 6 Jan 88) pp 19-25

[Article by A. N. Verevkin and V. I. Yakovleva, Institute  
of Biochemistry imeni A. N. Bakh, USSR Academy of  
Sciences, Moscow; Moscow State University]

[Abstract] Mathematical analysis was conducted on the  
performance of Escherichia coli 85 immobilized in 5  
percent TU 15-04-45479 carrageenan in the synthesis of  
L-malic acid from potassium fumarate. Assessment of a  
packed-bed flow reactor showed that the maximum rate  
of synthesis was  $4.5 \cdot 10^{-6}$  mmoles/mg<sup>-1</sup>/sec<sup>-1</sup> with virtu-  
ally complete (95-98 percent) conversion of fumaric to  
L-malic acid. Nevertheless, continuous synthesis was  
impossible with the present system due to cell washout  
from the topmost layers of the reactor, which rendered  
about 50 percent of the reactor inactive after about 200  
h of operation. Fumarase activity, however, remained  
essentially at the starting baseline level for 400 h. Figures  
4; references 10: 6 Russian, 4 Western.

UDC 576.809.53

**Hydroxylation of Indolyl-3-Acetic Acid by Aspergillus Niger IBFM F-212 Immobilized in Calcium Alginate and Carrageenan**

907C0630B Moscow PRIKLADNAYA BIOKHIMIYA I  
MIKROBIOLOGIYA in Russian Vol 26 No 1,  
Jan-Feb 90 (manuscript received 29 Jul 88) pp 26-32

[Article by T. G. Baklashova, K. A. Koshcheyenko and  
Ye. N. Sokolova, Institute of Biochemistry and Physi-  
ology of Microorganisms, USSR Academy of Sciences,  
Pushchino]

[Abstract] Comparative studies on the efficiency of  
Aspergillus niger IBFM F-212, immobilized in calcium



alginate or carrageenan, in hydroxylation of indolyl-3-acetic acid (IAA) demonstrated that mycelial activity in carrageenan was some 30 percent lower than in calcium alginate. The difference was attributed to the rather high temperature (40°C) employed in carrageenan immobilization. Trials with calcium alginate granules showed that activity was essentially equivalent to that of *Asp. niger* mycelium in solution, but that immobilization offered the advantage of greater stability, allowing for four sequential cycles of operation. The  $T_{1/2}$  for the activity of the calcium alginate granules was about 120 h, and could be extended even further by incubation of the granules with nutrient medium for 24 h. Under optimal continuous flow conditions complete conversion of IAA was obtained for a period of 15 days. Figures 7; tables 1; references 19: 3 Russian, 16 Western.

UDC 577.152.277:103

#### **Some Properties of Immobilized Terminal Deoxynucleotidyltransferase From Cattle Thymus**

907C0630C Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 26 No 1, Jan-Feb 90 (manuscript received 19 Feb 88) pp 33-38

[Article by A. G. Akishev, Scientific Research Construction and Technical Institute of Biologically Active Substances]

[Abstract] Studies were conducted on the stability and efficiency of terminal deoxynucleotidyltransferase (TDNT) isolated from cattle thymus immobilized on BrCN activated Sepharose columns. The results demonstrated that, at 37°C, immobilized TDNT retains 60 percent of the baseline activity for 6 h in 50 mM

K-phosphate buffer, pH 7.2, in the absence of the substrate. In addition, when the preparation was maintained at 25°C for 3 h a > 1.5-fold increase in TDNT activity was attributed to an apparent increase in active sites available to the substrate. Maximum activity of Sepharose-immobilized TDNT was observed in 240-280 nM Na-cacodylate buffer, pH 7.5-7.9, at 37-40°C. Figures 6; references 14: 5 Russian, 9 Western.

UDC 632.937.15

#### **Antigenic Structure of Bacillus Thuringiensis Endotoxins**

907C0630D Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 26 No 1, Jan-Feb 90 (manuscript received 16 Jun 88) pp 85-92

[Article by V. Ya. Yagudin and A. S. Krylov, "Biotehnologiya" Scientific Production Association, Moscow]

[Abstract] Comprehensive immunochemical studies were conducted on the  $\delta$ -endotoxin crystals of nine strains of *Bacillus thuringiensis* to assess the antigenic interrelationships among the various serotypes. The results demonstrated that the crystals of serotypes 1, 3, 4, 5, 8 and 10 contain one to two proteins with molecular weights in the 130 to 145 kD range, as well as a 55-120 kD protein. Radioimmunoassay tests demonstrated antigenic relatedness among the proteins as well as intraspecies heterogeneity. The spectrum of proteins is characterized by at least three antigenic determinants present in various combinations in the different strains, ranging from one to three. Radioimmunoassay titers were found to be proportional to the number of antigenic epitopes present in a given strain. Figures 3; tables 3; references 25: 7 Russian, 18 Western.



UDC 612.631.1:612.6.052-06

**Attempts at Incorporation of Exogenous DNA and Other Macromolecules into Mouse Spermatozoa by Liposomal and Calcium Phosphate Coprecipitation Methods**

907C0601B Kiev TSITOLOGIYA I GENETIKA  
in Russian Vol 24 No 2, Mar-Apr 90 (manuscript  
received 28 Nov 88) pp 52-55

[Article by V. S. Baranov, B. Brzobogatyy, N. V. Tsymlenko, L. Tadlichek, V. N. Gorbunova, T. B. Kazakova and L. Kovach and K. Boda, Institute of Obstetrics and Gynecology and Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad; Institute of Physiology of Agricultural Animals, Slovak Academy of Sciences, Bratislava, CSSR]

[Abstract] Studies were conducted on the utility of loaded liposomes and the calcium phosphate coprecipitation methods as vehicles for the introduction of exogenous DNA and labeled albumin into mouse spermatozoa, as part of a program of studies on the creation of transgenic animals. Initial studies with immature spermatozoa of BALB/c and CBA X C57BL mice demonstrated that liposomes with a positive surface charge are adsorbed much more efficiently to spermatozoal surface than negatively-charged liposomes in the presence of polyethylene glycol-1500. Immature sex cells treated with DNA-loaded liposomes incorporated the exogenous DNA, while mature spermatozoa failed to do so. Studies with the calcium phosphate coprecipitation technique indicated that, despite binding of the crystals to postacrosomal segments of the mature spermatozoa, incorporation of DNA did not occur even after 20 h of incubation. However, there were indications that incorporation may be possible in the presence of 3 percent dimethylsulfoxide. Figures 3; tables 1; references 10: 3 Russian, 7 Western.

UDC 579.252.5:[577.213.7:575.222.75

**Construction and Description of Recombinant Plasmid pOV13 as DNA Cloning Vector with Broad Bacterial Host Range**

907C0542D Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 12, Dec 89 (manuscript received  
2 Mar 89) pp 33-38

[Article by V. I. Zakharenko, V. N. Gorelov, A. V. Nenashev and A. G. Skavronskaya, Scientific Research

Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Technical details are presented on the construction of the recombinant plasmid pOV13 which possesses a broad host range among the Gram negative bacteria. pOV13 was constructed through recombination of plasmids RSF1010 and pVZ115, the latter representing a shortened form of pVZ5. RSF1010 imparted stability to pOV13, while pVZ115 provided selective resistance markers against streptomycin, kanamycin, and tetracycline. In addition, pOV13 possesses single target sites for the restriction endonucleases BamHI, BglI, SalI, SmaI, PvuII and XhoI, and two sites for PstI and HindIII. To date, pOV13 was successfully tested as a cloning vector in *E. coli* and in cryotransformation of *Brucella suis*. Figures 3; tables 2; references 19: 5 Russian, 14 Western.

UDC 612.212.94.015.2:612.6:577.213.7

**Cloning and Structural Analysis of cDNA for Human Prointerleukin-1A and Prointerleukin-1B**

907C0542A Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 12, Dec 89 (manuscript received  
21 Mar 89) pp 13-17

[Article by S. V. Kotenko, M. T. Bulenkov, V. P. Veyko, S. M. Yepishin, I. B. Lomakin, A. V. Yemelyanov, A. P. Kozlov, V. G. Konusova, A. Yu. Kotov, T. V. Kurbatova, V. L. Reshetnikov, A. S. Simbirtsev, S. A. Kettlinskiy and Yu. P. Vinetskiy, All-Union Scientific Research Institutes of Genetics (Moscow) and of Highly Purified Biopreparations (Leningrad)]

[Abstract] Conventional cloning techniques were employed for cloning cDNA encoding human prointerleukin-1A and prointerleukin-1B in order to establish a Soviet base for the production of these monokines. In the initial steps mRNA was obtained from human monocytes. Nucleotide mapping of the cDNA molecules and comparison with data in the literature showed the absence of nucleotide exchanges of the type that would lead to differences in amino acid sequences of prointerleukin-1A or prointerleukin-1B. However, several exchanges were observed in the 3'-nontranslatable end of the cDNA encoding prointerleukin-1B, indicating allelic variants at the gene level. Figures 2; references 17: 1 Russian, 16 Western.

UDC 616.931-036.2-07:612.017.1]-07

**Serologic Surveillance of Diphtheria Immunity***907C0535D Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 89 (manuscript received 19 Jan 89) p 119*

[Article by D. Ya. Kasimova, V. Yu. Kryukov, S. S. Sadykhova and K. M. Dzhavadova, Azerbaijan Scientific Research Institute of Virology, Microbiology and Hygiene imeni G. M. Musabekov, Baku; Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

[Abstract] In view of an increase in the incidence of diphtheria in the USSR, beginning with 1977, Baku was selected for monitoring the level of immunity in the pediatric and adult populations. The serologic studies revealed that 66.7 percent of the children and adolescents possessed sufficiently high titers for complete immunity, but that low titers (1:10 - 1:20) were present in 6.45 percent of that cohort, placing them at risk. In the various adult age groups 29.1 to 70 percent of the population was at risk because of low titers. On the whole, serology revealed that 51 percent of the population in Baku was at risk for diphtheria.

UDC 616.98:579.841.93]-084.4(470.62)

**Elimination of Brucellosis in Krasnodar Kray***907C0535E Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 89 (manuscript received 12 Oct 88) pp 122-125*

[Article by Ye. Ya. Nazarov, T. V. Yarov, Yu. M. Fedorov, N. P. Morozov, Ye. V. Strikhanova, A. A. Murry, F. A. Bibikov, V. K. Babkin and A. I. Maslov, Main Epidemiologic Administration, USSR Ministry of Health; Krasnodar Kray Sanitary Epidemiologic Station]

[Abstract] Monitoring of the brucellosis situation in Krasnodar Kray has demonstrated that the test-and-slaughter approach has been effective in reducing the incidence of brucellosis in cattle twelve-fold between 1961 and 1985. The present levels are as low as can reasonably be expected, and the cost effectiveness of the program from 1971 to the present has been almost five million rubles per year. Figures 1; tables 1; references 12 (Russian).

UDC 616.98:579.842.16]-036.2-07(47+57)

**Shigellosis in USSR: Etiologic Significance of Shigella Dysenteriae***907C0535B Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 89 (manuscript received 21 Nov 88) pp 37-42*

[Article by Yu. P. Solodovnikov, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health; All-Union Shigellosis Center, Moscow]

[Abstract] Epidemiologic data for 1983-1987 were reviewed to provide an indication of the importance of Shigella dysenteriae in the incidence of dysentery in the USSR. Based on the data for 27 indicator regions it is evident that in areas with satisfactory water supplies Sh. dysenteriae is a negligible etiologic factor. However, it accounts for 2 to 8 percent of the cases in areas with poor water supplies, a situation prevalent in Central Asia and especially in Uzbekistan. In the majority of cases Sh. dysenteriae strains 2 and 3 predominate in the high risk areas. In addition, a recent complication has been an increase in the number of cases of Sh. dysenteriae 1 imported from abroad in 17 of the 27 sites. Closer monitoring, accurate reporting, and improvements in sanitary facilities and water utilities, as well as health education, continue to be the key approaches to the control of dysentery and other intestinal infections. Tables 1; references 5 (Russian).

UDC 616.831-002-022.7:579.833.26]-022.39-036 (477.75)

**Clinical Features of Tick Borne Encephalitis in Crimea***907C0451A Moscow KLINICHESKAYA MEDITSINA in Russian Vol 67 No 12, Dec 89 (manuscript received 29 Mar 89) pp 80-83*

[Article by M. A. Borisova, S. Ya. Markeshin, N. Ya. Ryazanova, A. A. Degtyareva, T. F. Zakharova and M. V. Bychkova, Chair of Infectious Diseases, Crimean Medical Institute; Crimean Antiplague Station, USSR Ministry of Health, Simferopol; Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow]

[Abstract] An analysis was conducted on the clinical course of tick borne encephalitis (TBE) in the Crimean Oblast in 1985-1988, encompassing 52 cases and serological data on 5,774 healthy cohorts. Of the 52 cases, 34 patients presented with a febrile form of TBE, 8 with meningeal, 9 with focal, and one obliterated form. The average incubation period was 8.6 days, while the duration of TBE ranged from 9 to 68 days with an average of 27 days. The primary clinical manifestations at presentation consisted of fever (95.5 percent), severe headache (99.3 percent), vertigo (66.3 percent), muscle pain in the lower extremities (98.6 percent), joint pains (40.6 percent), nausea (75.8 percent), pallor (71.2 percent), and other common features. In the general population 12.5 percent of the inhabitants were shown to be positive for antibodies against the TBE virus with titers ranging from 1:135 to 1:1906. In general, relapses followed a more protracted and clinically severe course. Tables 1; references 6 (Russian).

UDC 577.21+578.81

**Phage Vector EMBL-3-Based Barley Nuclear Genome Library**

907C0602A Minsk IZVESTIYA AKADEMII NAUK  
BSSR: SERIYA BIOLOGICHESKIKH NAUK in  
Russian No 1, Jan-Feb 90 (manuscript received  
11 May 89) pp 108-110

[Article by A. G. Artyushchitskiy and I. D. Volotovskiy,  
Institute of Photobiology, Belorussian Soviet Socialist  
Republic Academy of Sciences]

[Abstract] Cursory details are presented on conventional  
techniques for the construction of a phage EMBL-  
3-based barley (*Hordeum vulgare*) nuclear genome  
library, subsequently assessed for the presence of the  
 $\alpha$ -amylase gene by appropriate DNA probes. The latter  
studies led to the isolation of clones bearing the entire  
gene or its fragments. Figures 1; tables 1; references 5: 2  
Russian, 3 Western.

UDC 579.841.11:579.252.5

**New Broad Host-Range Plasmid pBS1001**

907C0506E Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 11, Nov 89 (manuscript received  
27 Mar 89) pp 40-44

[Article by A. N. Dubeykovskiy, T. Z. Yesikova and A.  
M. Boronin, Institute of Biochemistry and Physiology of  
Microorganisms, USSR Academy of Sciences, Push-  
chino-on-Oka]

[Abstract] *Pseudomonas putida* BS1301 isolated from  
sewage was shown to utilize caprolactam as the sole

source of carbon and nitrogen, and to bear a small,  
cryptic, 30 MD plasmid. The plasmid, designated  
pBS1001, was mapped, shown to be efficient in con-  
jugation, capable of mobilizing nonconjugating plasmids,  
and to possess a broad-host range among gram-negative  
bacteria (*E. coli*, *A. tumefaciens*, *Ps. aeruginosa*, and  
*K. pneumonia* in addition to *Ps. putida*). Phenotypic  
markers were not identified. However, pBS1001 appears  
to share common conjugation and replication genes with  
plasmid RP4. Figures 2; tables 3; references 11: 7 Rus-  
sian, 4 Western.

UDC 579.842.11:579.252.5].08

***Pseudomonas putida* Plasmid Degradation of  
Biphenyl, Chlorobiphenyls, and m-Toluylate**

907C0506D Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 11, Nov 89 (manuscript received  
14 Sep 88; after revision 1 Feb 89) pp 32-36

[Article by A. L. Andreyeva, S. A. Selifonov and I. I.  
Starovoytov, Institute of Biochemistry and Physiology of  
Microorganisms, USSR Academy of Sciences, Push-  
chino-on-Oka]

[Abstract] A genetic analysis was conducted on plasmid  
pBS311 isolated from the *Pseudomonas putida* SU83  
responsible for degradation of biphenyl, chlorobiphe-  
nyls, and m-toluylate. The study included evaluation of  
cloning and gene expression of biphenyl degradation in  
*E. coli* HB101. The results demonstrated that pBS311  
belonged to the P-7 incompatibility group, and that  
biodegradation was markedly enhanced in the case of  
pBS311 plasmids. Expression in *E. coli* was much  
weaker, with 2,3-dioxybiphenyl, 3-methylcatechol, 4-  
methylcatechol and catechol degraded at a rate equal to  
10 percent of that seen with pBS311-bearing *Ps. putida*.  
Figures 2; tables 3; references 22: 8 Russian, 14 Western.

UDC 616-002.828-092:612.017.1.064]-085.361.438-036.8-07:[616.438 + 616.411+616.428]-091.8-092.9

### Effects of Synthetic Thymus Peptide (Thymogen) on Immune System in Candidiasis in Immunosuppression

907C0591A Moscow ARKHIV PATOLOGII in Russian Vol 52 No 1, Jan 90 (manuscript received 7 Jun 89) pp 20-25

[Article by O. K. Khmel'niksiy, G. M. Yakovlev, V. L. Belyanin, V. Kh. Khavinson, V. G. Morozov, and V. I. Deygin, Chair of Pathologic Anatomy, Advanced Training of Physicians Institute imeni S. M. Kirov, Leningrad]

[Abstract] Trials were conducted on the effects of thymogen on the course of *Candida albicans* in 56 intact and immunosuppressed 250 g guinea pigs. The experiments involved combinations of animals infected intraperitoneally with  $10^6$  *C. albicans*, animals subjected to 2 Gr whole-body X-ray irradiation, and animals treated intramuscularly with 1  $\mu$ g/kg of thymogen for 5-10 days, commencing with the day of infection. Thymogen was demonstrated to possess a wide spectrum of immunomodulating activities which were most pronounced in the guinea pigs infected with pathogenic fungi with secondary immunosuppression caused by X-ray irradiation. Attenuation of pathologic changes induced by candida was attributed to the immunostimulating properties of thymogen, the latter particularly noticeable in the thymus and intestinal lymphoid folliculi. Thymogen was especially effective in increasing the concentration of T-cells in the thymus, spleen, and lymph nodes, and to a lesser extent B-cell counts. Figures 4; tables 2; references 16: 12 Russian, 4 Western.

UDC 616.36-002.1-022.7:578.891]-085.373:578.245]-036.8

### Assessment of Therapeutic Effectiveness of Gene-Engineered Human $A_2$ -Interferon in Acute Viral Hepatitis B Patients

907C0591B Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 62 No 2, Feb 90 (manuscript received 21 Jul 88) pp 139-143

[Article by V. I. Pokrovskiy, A. V. Zmyzgova, E. Sh. Botsvadze, M. A. Andreychin, V. M. Frolov, R. T. Murzabayev, A. P. Mesnyankin, L. N. Kokareva and V. V. Malinovskaya, Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow]

[Abstract] A comparative study was conducted on 412 patients with acute viral hepatitis B (AVHB), 226 of whom were treated with recombinant  $A_2$ -interferon in combination with conventional management modalities. The observations revealed that  $A_2$ -interferon was well tolerated when given intramuscularly or as an intravenous drip. The highest rate (86.3 percent) of clinical

benefit was seen in AVHB patients treated intramuscularly with 2,000,000 IU for 5-12 days, particularly when therapy was started before the seventh day of jaundice. In that group hospitalization was reduced to 30 days versus about 37 days for control patients. With the optimum dosage scheme the incidence of superinfections was reduced 6.5-fold, and a two-fold reduction was noted in the incidence of HBsAg seropositive individuals. Among other beneficial effects on the immune system,  $A_2$ -interferon was also seen to increase endogenous interferon synthesis 2.6-fold. Tables 6; references 11: 6 Russian, 5 Western.

UDC 616.98:579.862.1]-057-085.281-036.8-078.73

### Clinical and Immunologic Aspects of Erysipelas in Heavy Industry Workers and Therapeutic Effect of Recombinant Interferon

907C0591C Moscow SOVETSKAYA MEDITSINA in Russian No 1, Jan 90 (manuscript received 10 Jan 89) pp 81-83

[Article by N. A. Peresadin, Yu. G. Pustovoy and L. A. Gavrilova, Chair of Infectious Diseases and Epidemiology, Voroshilovgrad Medical Institute]

[Abstract] The immune status and clinical course of erysipelas in 327 heavy industry workers were assessed in treatment with recombinant interferon (RINF). The cohort was represented by male and female metallurgists, coal-tar chemists, and workers in the chemical industry in Donbass ranging in age from 25 to 60 years. RINF was administered intramuscularly or intravenously in a dose of 2,000,000 IU per day for 5-7 days in the acute phase of the disease. In cases with complications, e.g., sepsis, the dosage was raised to 4 to 6 million IU per day. Therapy with RINF in the early stages of erysipelas had immediate clinical benefit, chief of which consisted of attenuation of the inflammatory process and toxic manifestations, as well as of the febrile response. In general, the duration of hospitalization was reduced by 7 days and hyperemia and edema by 5 days. Assessment of immune indicators revealed that RINF therapy led to an elevation of T lymphocytes and the T-helper/T-suppressor level to near-normal levels. Additional studies revealed that RINF administration diminished intensity of autoimmune processes. References 9 (Russian).

UDC 616.155.392-036.11-053.2-085.361.438

### Tactivin Therapy in Children with Acute Nonlymphoid Leukemia

907C0591D Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 35 No 1, Jan 90 (manuscript received 24 Mar 89) pp 14-16

[Article by T. S. Drozdova, L. A. Makhonova, S. A. Mayakova and D. Z. Tabagari, Scientific Research Institute of Clinical Oncology, All-Union Oncological Scientific Center, USSR Academy of Medical Sciences, Moscow]



[Abstract] The efficacy of tactivin therapy was assessed in 80 children, 14 days to 14 years old, with acute nonlymphoid leukemia (ANLL) undergoing conventional chemotherapy. In the acute cases (11) tactivin ( $100 \mu\text{g}/\text{m}^2$ ; s.c.) was administered for 3-5 days after each cycle of chemotherapy. In cases of remission (15) tactivin ( $100 \mu\text{g}/\text{m}^2$ ; s.c.) was administered monthly for 3 days in a row between chemotherapy treatments for 2-3 years as a maintenance schedule, and in cases of prolonged remission without chemotherapy for an additional 2-3 years. Evaluation of the results in tactivin-treated and control patients demonstrated that, in general, tactivin alleviated the adverse effects of chemotherapy and stimulated the T cells without affecting B cells. Tactivin treatment was also responsible for the reduction in intercurrent diseases, prolonged the period of remission, and elevated the three year survival rate to 15.4 percent in comparison with 9.3 percent for control patients. Tables 3; references 12: 8 Russian, 4 Western.

UDC 579.222

**Mitogenic Activity of Glycopolymers of Clavibacter (Corynebacterium) Michiganense and Pseudomonas Solanacearum**

907C0543D Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 6, Nov-Dec 89 (manuscript received 6 Jan 89) pp 75-79

[Article by L. D. Varbanets, S. L. Rybalko, I. L. Marichev, S. T. Dyadyun, A. F. Frolov and I. Ya. Zakharova, Institute of Microbiology and Virology, Ukrainian Soviet Socialist Academy of Sciences, Kiev; Kiev Scientific Research Institute of Epidemiology and Infectious Diseases]

[Abstract] A comparative analysis was conducted on the mitogenic potential of glycoproteins isolated from Clavibacter michiganense and lipopolysaccharides isolated from Pseudomonas solanacearum, Pseudomonas sp., and E. coli. Mitogenicity was assessed in terms of  $^3\text{H}$ -thymidine uptake by human lymphocytes. All preparations were shown to possess mitogenic activity, with the highest activity exhibited by Cl. michiganense polysaccharides. The latter also exceeded the mitogenic activity of mefenamic acid. More detailed studies with Ps. solanacearum lipopolysaccharides demonstrated that the mitogenic activity was due to the lipid A and core oligosaccharide components of lipopolysaccharides, whereas in the case of E. coli the O side chain and the KDO phosphate fractions were inactive. Figures 1; tables 1; references 10: 5 Russian, 5 Western.

UDC 616.155.1-022.7:616.157]-078

**Entrapment of Intact Bacteria in Erythrocytes**

907C0535C Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 89 (manuscript received 11 Nov 88) pp 118-119

[Article by T. P. Gening and T. F. Shevchenko, Semipalatinsk Medical Institute]

[Abstract] A method has been devised for the encapsulation of viable Shigella flexneri in human erythrocytes, with a view toward eventual use of such preparations as vaccines. The basic approach consisted of pore creation in the red cells at  $4^\circ\text{C}$  in 0.014 M NaCl, exposure to excess S. flexneri, incubation at room temperature, and centrifugation and washing. The number of bacteria enclosed per red cell ranged from three to seven, corresponding to an entrapment rate of 15-35 percent.

UDC 612.017.1.014.46:[615.357:577.175.732]+  
[615.357:577.175.76

**Immunostimulation by Neurotensin, Pentagastrin and Thymopentin**

907C0444B Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 11, Nov 89 (manuscript received 20 Sep 88) pp 584-587

[Article by G. A. Belokrylov, I. V. Molchanova and O. Ya. Popova, Institute of Experimental Medicine, USSR Academy of Medical Sciences Leningrad]

[Abstract] A comparative analysis was conducted on the immunostimulant properties of neurotensin, pentagastrin and thymopentin, employing in vivo and in vitro techniques. Subcutaneous administration of pentagastrin or thymopentin enhanced the hemagglutinin response to ram erythrocytes in 14-16 g male CBA mice. An analogous degree of enhancement was also seen in the production of IgM-producing splenic cells. Neurotensin, however, was found to be ineffective. Evaluation of neutrophil phagocytic activity for Staphylococcus aureus revealed marked enhancement by neurotensin and thymopentin, but not by pentagastrin. However, the three peptides stimulated enzymatic activity of neutrophils according to the nitroblue tetrazolium test, with pentagastrin showing the least activity. Finally, the peptides were effective in accelerating maturation of lymphoid cells into T cells expressing the Thy-1 antigen, but differed in protecting the T cells from the cytotoxic effects of specific antisera. Tables 3; references 9: 6 Russian, 3 Western.

UDC 612.112.3.063:612.015.2:577.112.853

**Enhancement of Phagocytosis by Fibronectin Tripeptide**

907C0444C Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 11, Nov 89 (manuscript received 30 Mar 89) pp 589-591

[Article by G. A. Yermolin, S. N. Turishchev and M. V. Ovchinnikov, Laboratory of Immunochemistry, Institute of Experimental Cardiology, All-Union Cardiological Scientific Center, USSR Academy of Medical Sciences, Moscow]



[Abstract] Trials were conducted with polymorphonuclear leukocytes and monocytes derived from Wistar rats to determine whether fibronectin tripeptide T (Arg-Gly-Asp, RGD), which has been implicated in the adhesiveness of a number of molecules, enhances phagocytosis. Incubation studies at 37°C with  $5 \cdot 10^6$  cells/ml and various

concentrations of the tripeptide showed that phagocytosis of latex particles was significantly stimulated. Stimulation was dose-dependent and maximum with concentrations of  $10^{-2}$  to  $10^{-3}$  mM. These findings represent the first report that tripeptide T regulates phagocytosis. Figures 3; references 12: 2 Russian, 10 Western.

### Laser Treatment of Atherosclerosis

907C0169D Moscow MEDITSINSKAYA GAZETA  
in Russian 6 Oct 89 pp 3

[Article by A. Gatilov]

[Abstract] Work on the use of laser equipment in the treatment of atherosclerosis has been extensive in the scientific centers of Moscow, Kaunas and a number of other cities. The first promising results have been achieved. An effective method of destruction of atherosclerotic plaque has been developed at the Institute of Cardiovascular Surgery imeni A. M. Bakulev, USSR Academy of Medical Sciences. In three years, more than 100 operations have been performed. All patients, many of whom were in serious condition, are feeling better. The method of the surgery is simple. A small puncture aperture is made in the femoral artery under local anesthesia. An x-ray contrast medium is introduced to the patient's blood. The vessels thus become visible to the surgeon. A tiny catheter is hand-fed without difficulty to the location of the plaque. A beam of red light from a laser is then switched on for a few minutes, usually two to five minutes. That is the entire operation. After three to five days, the patient goes home. It is too early to say that this represents a complete victory over atherosclerosis, but the first results are quite promising and the surgeons are optimistic.

UDC 616.13+616.132.2]-004.6-089:615.849.19

### Intravascular Laser Treatment of Atherosclerosis

907C0453A Moscow VESTNIK AKADEMII  
MEDITSINSKIKH NAUK SSSR in Russian No 12,  
Dec 89 (manuscript received 27 Feb 89) pp 32-39

[Article by Yu. S. Petrosyan, N. N. Kipshidze, S. A. Putilin, Yu. G. Avalyani, V. P. Kertsman, L. P. Agadzhanova, B. N. Malyshev, G. N. Vlasov, V. A. Salyuk, N. L. Loshakov, T. G. Nikitina and A. P. Litvinov, Institute of Cardiovascular Surgery imeni A. N. Bakulev, USSR Academy of Medical Sciences, Moscow]

[Abstract] An analysis was conducted on the outcome of transluminal laser angioplasty and atherolysis performed in 62 patients with various forms of atherosclerosis. In some cases laser therapy was combined with balloon angioplasty or bypass surgery. The Soviet made laser instruments emitted at 514, 530, 632, 850, and 1064 nm wavelengths and permitted wide power output regulations. Treatment was successful in 93 percent of the cases, with failure attributed to thrombosis in the remaining 7 percent. In general, failure was attributed to poor orientation of the catheter and irradiation of healthy endothelium rather than a plaque. Figures 2; tables 2; references 18: 5 Russian, 13 Western.

UDC 616.831.9-008.953.6-02:615.849.19]-092.9-076

### Effects of Laser Irradiation on Histophysiology of Basophils in Cerebral Dura Mater

907C0444C Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 108 No 10, Oct 89 (manuscript received  
2 Feb 89) pp 493-495

[Article by V. M. Chertok, A. Ye. Kotsyuba and A. V. Laryushkina, Chair of Human Anatomy, Vladivostok Medical Institute]

[Abstract] Histochemical and morphometric studies were conducted on 170-180 g albino rats to assess the effects of 632.8 nm wavelength helium-neon laser irradiation (HNL-108, 0.76 mW/cm<sup>2</sup>) on tissue basophils in the dura mater of the right parietal lobe. The data were evaluated in relation to exposure times ranging from 0.5 sec to 3 h. The results demonstrated that the basophils were highly susceptible to the laser modality employed. Within 0.5 sec the number of degranulated basophils increased two and one-half times with degranulation reaching a maximum between 15 min and 1 h of exposure. The number of intact basophils showed a corresponding decrease, while the total counts remained unaltered. After 3 h the total count was 25 percent below the control count. Since equivalent changes were encountered on the left side of the head a reflex mechanism was postulated to be in operation. Figures 1; references 13: 7 Russian, 6 Western.

UDC 612.821.7+599.745.3

### Sleep and Wakefulness in Harp Seal Pups

907C0476B Moscow ZHURNAL VYSSHEY  
NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA  
in Russian Vol 39 No 6, Nov-Dec 89 (manuscript  
received 22 Apr 88; after revision 12 Apr 89)  
pp 1061-1069

[Article by O. I. Lyamin, A. I. Oleksenko and I. G. Polyakova, Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Sleep patterns, heart rate, and respiratory patterns in ten day and one month old harp (Greenland) seal pups (*Pagophilus groenlandica*) were assessed for

comparison with similar data derived for Caspian and grey seals. Electrophysiological monitoring of four pups revealed that in a 24 h period active wakefulness occupies 23.4 percent of the time, on the average, resting wakefulness 32.6 percent, somnolence 4.8 percent, slow-wave sleep 31.5 percent, and paradoxical sleep 7.7 percent. An average sleep cycle was 18.2 min in duration, with identical electrocorticograms recorded from both cerebral hemispheres. The heart rate was at a minimum during paradoxical sleep, in combination with diminished and irregular respiratory activity. Respiration was rapid and regular during resting wakefulness, while apneic phases were interspersed with hyperventilation in slow-wave sleep. These patterns were similar to those prevailing in other seals and reflecting adaptation to cold habitats. Figures 2; tables 2; references 10: 7 Russian, 3 Western.

UDC 615.471.03:[616-073.756.8:681.3

**Scintillator-Photodiode Detector for Medical X-Ray Computer Tomography**

907C0592A Moscow MEDITSINSKAYA TEKHNIKA in Russian No 1, Jan 90 (manuscript received 30 Dec 88) pp 3-5

[Article by V. V. Konkov, A. G. Turyanskiy, Ye. P. Tutov, and O. P. Fedoseyeva, All-Union Scientific Research Construction Engineering and Technological Institute of the Cable Industry, Moscow]

[Abstract] Technical details are provided on a fourth generation X-ray computer tomography detector based on CsI(Tl) scintillator and Si photodiode. Evaluation of spatial resolution characteristics demonstrated that the detector in question was comparable in performance with commercial Quad-1 detector and CdWO<sub>4</sub> and ZnSe(Te) scintillators. The Cs(Tl)-Si detector gave a spatial resolution of about 0.7 mm with a focusing beam of less than 1.2 mm. Figures 3; tables 1; references 5 (Russian).

UDC 616-092:612.017.1-064-08:[616.15:615.831.76

**Clinical Benefit of Transfusion of UV-Irradiated Autologous Blood in Treating AIDS Patients**

907C0592C Moscow VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 144 No 1, Jan 90 (manuscript received 7 Aug 89) pp 55-57

[Article by N. A. Dvaladze, V. A. Belokurov, G. S. Gvaramiya, P. S. Gamkrelidze, V. I. Kirgan, A. V. Kosyan, G. Ya. Melamud, Yu. N. Mereshko, and G. V. Golovin, professor, Gagra TsGB [as published]; Chair of Blood Transfusion and Hematology, Leningrad Advanced Training of Physicians Institute imeni S. M. Kirov]

[Abstract] Description is provided of the clinical course of a female AIDS patient who underwent a laparotomy, and was eventually treated by transfusion of UV-irradiated autologous blood. Immediately after transfusion body temperature fell by 1°C and remained at 37.5-37.7°C for the next several days. Additional subjective and objective manifestations of clinical improvement included greater activity and return of appetite, and reduction of pulmonary infiltration. The patient was discharged with subsequent serologies failing to detect anti-HIV antibodies. These observations emphasize the need for comprehensive studies on the role of transfusions of autologous UV-irradiated blood in AIDS. Figures 1; references 11 (Russian).

UDC 616.24-089.85:615.832.8.03

**Plasma Scalpel in Lung Surgery**

907C0592B Moscow GRUDNAYA I SERDECHNO-SOSUDISTAYA KHIRURGIYA in Russian No 2, Feb 90 (manuscript received 24 Jan 89) pp 41-45

[Article by G. I. Lukomskiy, I. V. Stupin, A. S. Kachikin and G. N. Tikhonova, First Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] Animal experiments and clinical trials were conducted with helium-based plasma scalpel SUPR-M to assess its efficacy in pulmonary resections. Studies on 5-20 kg dogs demonstrated that SUPR-M was effective in controlling hemostasis, with resolution of the granulation tissue requiring some 30 days. In 40 pulmonary resections, 15 for lung cancer and 16 for pyogenic infections of the lungs and pleura, SUPR-M was found to have utility in wound disinfection and as a hemostatic modality. In general, the incidence of postsurgical empyema was reduced two-fold following the use of SUPR-M. However, control of diffuse hemorrhage from the walls of the pleural cavity was best managed in conjunction with conventional measures. Figures 3; references 3 (Russian).

UDC 616.831-005-084.3:65.011.56

**System of Automated Diagnosis of Cerebrovascular Diseases for Preventive Examinations of Public**

907C0615A Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian Vol 90 No 1, Jan 90 (manuscript received 20 Oct 86) pp 13-16

[Article by V. D. Troshin and Yu. G. Vasin, Chair of Nervous Diseases, Department of Angioneurology, Central Scientific Research Laboratory, Gorky Medical Institute imeni S. M. Kirov; Laboratory of Automated Processing of Experimental Data, Scientific Research Institute of Applied Mathematics and Cybernetics, Gorky University imeni N. I. Lobachevskiy]

[Abstract] A medical information system has been developed for use in outpatient clinics to diagnose cerebrovascular pathologies caused by atherosclerosis, arterial hypertension, and vegetovascular dystonias. The parameters used include type, duration, and frequency of headache, time of headache onset, vertigo, tinnitus, memory loss, conditions of cranial hemodynamics, etc. This system was used to examine 2,180 people and demonstrated 95-98 percent accuracy in classifying sixteen classes of test subjects. Over 95 percent of diseases are diagnosed before the patient sees a doctor, making it an economical and time-saving device. Figures 1; references 13 (Russian).

UDC 57.043:578.088

**Cryopreservation of Large Volumes of Erythrocytes Using Polyethyleneoxide-1500***907C0615B Kiev KRIOBIOLOGIYA in Russian No 1, Jan-Mar 90 (manuscript received 1 Jul 88) pp 41-44*

[Article by A. N. Novikov, S. T. Oleynik, O. V. Lipina, and Ye. N. Chernysh, Cryobiology and Cryomedicine Institute, Ukrainian Soviet Socialist Republic Academy of Sciences, Kharkov]

[Abstract] The potential was assessed for increasing the state of preservation of erythrocytes cryopreserved in concentrations of polyethyleneoxide-1500 (PEO-1500) up to 10 percent by varying the cooling rate at its different stages. PEO-1500 prepared in 10 and 20 percent concentrations in physiologic solution was used as a cryopreservative in researching the state of preservation of human erythrocytes when cooled to negative temperatures. The state of preservation was evaluated by the content of free hemoglobin and osmotic brittleness with a 1:1 ratio of cryopreservative and erythrocytes, temperature of 24°C for 30 minutes, then cooled 0.2+0.05°C per minute, and warmed 0.7+0.05°C per minute. Cryoprotection in concentrations of cryopreservative used in slow water-ice phase transition is inadequate, probably due to the formation of microscopic cracks on the membranes which are stabilized by PEO-1500 and which subsequently destroy the membrane upon further cooling. References 5: 3 Russian, 2 Western.

UDC 616-001.32-08

**Detoxication in Critical Rhabdomyolysis***907C0457A Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian Vol 143 No 10, Oct 89 (manuscript received 5 Apr 88) pp 107-111*

[Article by R. I. Novikova, V. P. Shano, V. I. Chernyy, L. V. Logvinenko, Ye. K. Shramenko and T. Ye. Abashina, Chair of Anesthesiology and Resuscitation, Faculty of Advanced Training of Physicians, Donetsk Medical Institute imeni M. Gorkiy]

[Abstract] A study was conducted to define optimum therapeutic modalities in the management of rhabdomyolysis and positional compression injuries. The cohort consisted of 92 men and women ranging in age from 19 to 47 years. Based on pathogenetic studies, primary management in the early stages was directed at preventing acute hepatorenal shutdown via aggressive detoxication. Accordingly, optimum results were obtained with combined modality therapy involving hemodialysis, ultraviolet irradiation of the blood and lymphatic fluid, and hyperbaric oxygenation. Of the 38 patients seen in the early stages of acute hepatorenal insufficiency who were detoxified in this manner the mortality rate was 6 percent, a marked improvement

over the mortality figures of 30-75 percent commonly reported for severe rhabdomyolysis. Figures 2; references 6 (Russian).

UDC 615.384.015.4:616.152.11].076.9

**Effects of Plasma Substitute Oxyamal on Water and Acid-Base Balance in Blood During Infusions***907C0452A Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 34 No 12, Dec 89 (manuscript received 2 Mar 89) pp 25-28*

[Article by Yu. A. Litvinenko, I. R. Kolonina and N. A. Gorbunova, doctor. med. sci., All-Union Hematological Scientific Center, USSR Ministry of Health, Moscow]

[Abstract] Oxyamal, a Soviet oxyethylated starch plasma substitute, was tested for its effects on the water and acid-base balance in 10-20 kg outbred dogs. Infusion of oxyamal to dogs in hemorrhagic shock (loss of 55-57 ml/kg of blood, blood pressure of 40 mm Hg, blood pH 7.20) led to an immediate rise in pH and complete recovery of normal acid-base balance in 2 h due in large measure to a stable improvement in the circulating blood volume to 64 ml/kg. Concomitantly, extracellular fluid volume increased by 20 percent. Infusion of oxyamal was accompanied by a five-fold increase in diuresis after 2 h and a four-fold increase after 4 h. Overall, the net fluid balance in the experimental dogs was -8 ml/kg and +4 ml/kg in control dogs. These observations demonstrated that in dogs oxyamal was an effective agent for restitution of circulating blood and plasma volumes, and restoration of normal hemodynamics and acid-base balance. Accordingly, oxyamal deserves consideration for clinical trials. Figures 3; tables 2; references 7: 2 Russian, 5 Western.

UDC 615.2/.3.015:615.847.8.032.14].  
015.4:612.11].076.9**Effects of Intravenous Administration of Ultradispersed Ferromagnetic Particles on Blood Morphology and Function***907C0452B Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 34 No 12, Dec 89 (manuscript received 18 Nov 88) pp 37-40*

[Article by V. A. Volkonskiy, Scientific Research Institute of Medicinal Technology and Safety, Staraya Kupavna, Moscow Oblast]

[Abstract] The putative importance of magnetized microcapsules in drug delivery led to an assessment of ultradispersed ferromagnetic particles on the blood in 200-240 g outbred male rats. Intravenous administration of 50 mg/kg of ultradispersed 0.2-1 µm reduced iron particles in 30 percent sucrose led to a 26.4 percent increase in hemoglobin and a 4 percent increase in hematocrit after 7 days. Concomitantly, erythrocyte and leukocyte counts increased by 30 and 42 percent, respectively. After 17 days hemoglobin and erythrocyte levels



remained elevated by 16.3 and 28 percent, respectively, while leukocyte elevation was insignificant. Other findings included a decrease in the erythrocyte sedimentation rate on days 7 and 17 by 100 and 43 percent, respectively, and corresponding increases in blood coagulation times by 160 and 21 percent, and in fibrinolysis by 62 and 46 percent.

Thrombocyte counts were not affected, but both phagocytosis and the phagocytic index of neutrophils were significantly increased. The sole effect of an equivalent dose of magnetite was a slight increase in neutrophil phagocytic activity, while sucrose alone was entirely innocuous. Tables 1; references 10: 5 Russian, 5 Western.

UDC 579.852.11:579.252.5:579.254.4

**Transfer of Plasmid pXO2 by Transduction and Conjugation in *Bacillus Anthracis***

907C0542E Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 12, Dec 89 (manuscript received  
24 Apr 89) pp 39-43

[Article by A. S. Stepanov, O. B. Puzanova, S. V. Gavrilov, Yu. V. Brandzishvskiy, I. V. Bragin and P. I. Anisimov, "Mikrob" All-Union Scientific Research Antiplague Institute, Saratov]

[Abstract] An analysis was conducted on the transfer of plasmid pXO2, responsible for capsule production by *Bacillus anthracis*, into unencapsulated *B. anthracis* strains STI-1, Sterne, KM33, and KM35. The study was conducted as part of an extensive effort at genetic analysis of pathogenicity factors. Employing conventional techniques, pXO2 was transferred by transduction using phage CP54ant, and via conjugation by the self-transmissible mobilizing plasmid pAMB1, which is responsible for toxin production. Maximum conversion of the recipients to cap<sup>+</sup> status (ability to synthesize capsids) in transduction was on the order of  $1-3 \times 10^{-8}$ ; efficiency of conjugation was also on the same order of magnitude. Animal testing showed that introduction of pXO2 into recipient strains increased their virulence for white mice by five orders of magnitude. Figures 1; tables 4; references 11: 4 Russian, 7 Western.

UDC 576:664.16

**Synthesis of Cyclodextringlucanotransferase by Microorganisms That Use Cyclodextrins as Their Sole Source of Carbon**

907C0609A Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 310 No 6, Feb 90 (manuscript  
received 18 Aug 89) pp 1489-1492

[Article by N. G. Usanov, O. N. Loginov, and A. I. Melentyev, Biology Institute, Bashkir Scientific Center, Ural Division, USSR Academy of Sciences, Ufa]

[Abstract] Cyclodextringlucanotransferase ( $\alpha$ -D-glucano-/-transferase EC 2.4.1.19) is a microbial enzyme able to convert linear and branched molecules of  $\alpha$ -glucanes into cyclic molecules with six to eight glucose radicals. They are widely used for microcapsulation. The tropic features of microorganisms that produce enzymes that make cyclic compounds were studied and methods of isolating them from the soil and other natural sources were developed. All 17 *Bacillus macerans* and *Bacillus* sp. tested were able to utilize cyclodextrins. Cyclodextringlucanotransferase active microorganisms probably synthesize cyclodextrins to store  $\alpha$ -glucanes for easy access. Microorganisms utilize cyclodextrins as their sole source of carbon in connection with the synthesis of extracellular cyclodextringlucanotransferase. Figures 2; tables 1; references 9: 1 Russian, 8 Western.

UDC 582.288:620.193

**Effects of Culture Age and Cell Wall Composition on Conidial Adhesiveness of Polymer-Degrading Fungi**

907C0543C Kiev MIKROBIOLOGICHESKIY  
ZHURNAL in Russian Vol 51 No 6, Nov-Dec 89  
(manuscript received 5 Jul 88) pp 63-67

[Article by I. V. Kaznacheyev, K. Z. Gumargaliyeva, Yu. V. Moiseyev and S. N. Mironova, Institute of Chemical Physics, USSR Academy of Sciences, Moscow; Institute of Microbiology, Belorussian Soviet Socialist Republic Academy of Sciences, Minsk]

[Abstract] An analysis was conducted on the correlation between the chemical composition of cell walls of *Aspergillus niger*, *A. terreus*, *Penicillium funiculosum* and *Trichoderma viride* and adhesion of their conidia to polyethylene surfaces. Cultivation of the fungi for 30 days and assessment of cell wall composition on the basis of infrared spectra revealed that in the case of *T. viride* the concentration of amides fell from 45 percent on day 3 to 26-28 percent on day 15, while phospholipids increased from 42 to 56 percent and glycans from 13 to 18 percent. No significant time-related changes were noted in *P. funiculosum* and *A. terreus*. Detailed studies on *A. niger* showed an increase in protein components from 5 to 58 percent and a reduction in  $\alpha$ -glycans from 24 to 8 percent and of phospholipids from 71 to 34 percent. Concomitantly, adhesiveness of the *A. niger* conidia to polyethylene increased 3.4-fold in the 15- and 30-day cultures in comparison with the 3 day culture. These findings demonstrated that larger conidia undergo greater changes in the chemical composition of the cell wall, and that the changes are related to adhesive properties. Figures 2; tables 1; references 11: 9 Russian, 2 Western.

UDC 582.288-11

**Surfactant and Emulsifying Properties of *Candida Lipolytica* Y-917 Culture Grown on N-Hexadecane**

907C0543B Kiev MIKROBIOLOGICHESKIY  
ZHURNAL in Russian Vol 51 No 6, Nov-Dec 89  
(manuscript received 3 Jan 89) pp 56-59

[Article by O. Yu. Lesyk, Ye. V. Karpenko, S. A. Yeliseyev and A. A. Turovskiy, Department of Coal Physical Chemistry and Technology, Institute of Physical Chemistry, Ukrainian Soviet Socialist Republic Academy of Sciences, Lvov]

[Abstract] A time-course analysis was conducted on the surfactant and emulsifying properties of a culture medium used for the cultivation of *Candida lipolytica* Y-917, with n-hexadecane as the sole source of carbon. Evaluation of the culture fluid revealed that peak surfactant activity was evident after 90 h of growth, whereas maximum emulsification was obtained after 11 days of

cultivation. Chemical studies demonstrated that exolipids were responsible for the surfactant properties of the medium, and a polysaccharide-protein complex was responsible for the emulsifying properties. Figures 1; references 12: 1 Russian, 11 Western.

UDC 579.69:622.7

#### **Changes in Glucose Metabolism During Strain 182-A Leaching of Manganese Ores**

907C0543A Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 6, Nov-Dec 89 (manuscript received 10 Dec 87) pp 39-44

[Article by Yu. S. Babenko, L. P. Golodok and M. Z. Serebryanaya, Dnepropetrovsk State University]

[Abstract] Glucose metabolism in *Bacillus* sp. strain 182-A was seen to undergo significant changes during leaching of manganese ores. The addition of 1 percent mg ore or 0.01-0.1 percent  $MnCl_2$  to the glucose-mineral medium led to a 7.9- to 8.5-fold increase in lactic acid production, indicating enhancement of glycolysis. Enzyme studies demonstrated increased activities of enzymes involved in glycolysis, the pentose phosphate cycle, and the tricarboxylic acid cycle. Of key significance was the two-fold increase in secretion of citric acid, which was implicated in the efficiency of leaching. Figures 2; tables 4; references 22: 12 Russian, 10 Western.

UDC 579.852.11:577.212.3].043:612.592

#### **Cryotransformation of *Bacillus Anthracis* by Plasmid pUB110 DNA**

907C0542C Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 12, Dec 89 (manuscript received 11 May 89) pp 26-30

[Article by O. B. Puzanova, A. S. Stepanov, N. I. Belyakova, O. G. Loginova, B. N. Ilyashenko and S. Ya. Dityatkin, "Mikrob" All-Union Scientific Research Antiplague Institute, Saratov; Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] A method was developed for rendering *Bacillus anthracis* competent for transformation by pretreatment with glycine and freezing of the bacterium and DNA mixture. The optimum conditions for transformation with plasmid pUB110 derived from *B. subtilis* consisted of treatment of the *B. anthracis* cells with 5 percent glycine for 2.5 h in the presence of 0.10-0.15 M of  $Mg^{2+}$ , followed by addition of the plasmid and freezing at  $-196^{\circ}C$  for 3 min, and thawing at  $37-42^{\circ}C$ . The efficiency of transformation with this approach was on the order of  $3.1 \times 10^2$  transformants per  $\mu g$  of pUB110 DNA. The process was less efficient if the glycine step was omitted. Figures 3; tables 3; references 11: 5 Russian, 6 Western.

UDC 579.842.23:579.252.5].579.222:546.46

#### **Effects of $Mg^{2+}$ Ions on Properties of Some Strains of *Yersinia Pestis***

907C0542B Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 12, Dec 89 (manuscript received 6 Jun 89) pp 17-21

[Article by M. I. Zarenkov, S. R. Sayamov and Ye. G. Goncharov, Scientific Research Antiplague Institute, Rostov-on-Don]

[Abstract] An analysis was conducted on the effects of  $Mg^{2+}$  on *Yersinia pestis*, which demonstrated that  $Mg^{2+}$  deficiency restricts their growth on oxalate media at  $37^{\circ}C$ . Detailed studies with *Y. pestis* 377 showed that a  $Mg^{2+}$  concentration of greater than 10 nM is required for growth, and that  $Mg^{2+}$  cannot be replaced by  $Ca^{2+}$ . Deficiency in  $Mg^{2+}$  was shown to predispose *Y. pestis* to autolysis, with genetic studies implicating a 20 MD deletion in plasmid pYT 377 as being responsible for activation of autolysis. These findings suggest that  $Mg^{2+}$ , in addition to  $Ca^{2+}$ , is involved in the adaptation of *Y. pestis* to in vivo conditions. Figures 3; tables 2; references 13: 5 Russian, 8 Western.

UDC 579.852.11:579.253].083.3

#### **Plasmid Screening in Differentiation of *Bacillus Anthracis* from Closely Related Species of Edaphic *Bacillus***

907C0535A Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 89 (manuscript received 6 Jul 88) pp 26-28

[Article by Yu. A. Akhmedzyanov, P. I. Naymanov and Yu. I. Sorkin, Irkutsk Scientific Research Antiplague Institute of Siberia and the Far East]

[Abstract] Plasmid screening was evaluated as a method of differentiation between pathogenic *Bacillus anthracis* and vaccine strains *B. cereus* and *B. thuringiensis*. The results demonstrated that virulent strains of *B. anthracis* carry two plasmids, pOX1 and pOX2, which were lacking in the unencapsulated strains. However, the latter carried from two to eight other plasmids. *B. cereus* and *B. thuringiensis* were also free of pOX1 and pOX2, although they exhibited a variety of other plasmids. These findings point to the utility of using plasmid screening as a differential test in the diagnostic laboratory. Figures 3; references 12: 2 Russian, 10 Western.

UDC 616.155.33-008.13-008.64-02:[615.919:579.861.2

#### **Inhibition of Antibacterial Activity of Mouse Peritoneal Macrophages by Combination of Staphylococcal Enterotoxin A and Endotoxin**

907C0444D Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 11, Nov 89 (manuscript received 17 Jul 88) pp 591-593

[Article by Ye. V. Ryabichenko and Yu. V. Yezepchuk, Laboratory of the Molecular Aspects of Bacterial Pathogenesis, Scientific Research Institute of Epidemiology

and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Peritoneal macrophages derived from C57BL/6 male mice (16-18 g) were exposed to staphylococcal toxin A (STA) and *Serratia marcescens* endotoxin (SME; prodigiosan) in order to assess their effects on phagocytosis. Pretreatment of the mice with STA, SME, or a combination of both, as well as in vitro incubation studies revealed an overall depression of macrophage

counts and phagocytosis of *Staphylococcus aureus* for 24 h. Agreement between the in vitro and in vivo results provided proof that STA acted directly on the macrophages. In view of the fact that phagocytosis constitutes the first line of defense in infectious processes, the data indicating a synergistic effect between Gram positive and negative bacteria demonstrates that such combinations may lead to serious septic conditions. Tables 4; references 7: 2 Russian, 5 Western.

UDC 579.834.113:[579.252.5:577.212.3],086.3

**Cultivation Conditions and Function Analysis of Plasmid ColE1 Par-Loci**

907C0506C Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 11, Nov 89 (manuscript received  
6 Mar 89) pp 26-28

[Article by M. N. Kolot, Institute of Molecular Genetics,  
USSR Academy of Sciences, Moscow]

[Abstract] An analysis was conducted on the function of the par locus of plasmid ColE1 to assess its potential usefulness in enhancing the stability of recombinant multi-copy plasmids. Trials with *E. coli* AB1157 cells that bear the plasmids pKS490 and pKA2 demonstrated efficient partition of the plasmids in a wide spectrum of culture conditions. The par-locus functioned efficiently over a temperature range of 30 to 42°C on both minimal and enriched media with and without ampicillin, various phases of the bacterial growth curve, and under aerobic and microaerobic conditions. Figures 1; references 10: 2 Russian, 8 Western.

UDC 579.861.2:579.254.45]:[579.222:577.152.277

**SsrI Class II Restriction Endonuclease from Staphylococcus Saprophyticus**

907C0506B Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 11, Nov 89 (manuscript received  
27 Mar 89) pp 24-25

[Article by V. S. Dedkov, G. G. Prikhodko, L. I. Puchkova, G. D. Serov, N. I. Rechkunova and S. Kh. Degtyarev, Scientific Research Construction and Technological Institute of Biologically Active Substances, 'Vektor' Scientific Production Association, Berdsk, Novosibirsk Oblast]

[Abstract] HpaI restriction endonuclease derived from *Haemophilus parainfluenza* remains one of the most useful tools in molecular biology, yet the required culture conditions render its preparation a complicated process. Accordingly, search of other bacteria led to the identification and isolation of an enzyme from *Staphylococcus saprophyticus* with an analogous target site, designated SsrI. Cleavage studies on phage  $\lambda$  cI857 DNA and comparison with the results obtained with HpaI confirmed the fact that SsrI acted on the 5' - GTT [down arrow] AAC -3' sequence. SsrI may be used in place of

HpaI in all genetic engineering studies. Figures 2; references 8: 3 Russian, 5 Western.

UDC 578.835.2:[578.224:578.5

**Primary Structure of VP1 Protein Gene of Foot and Mouth Disease Virus Serotype Asia I**

907C0542F Moscow MOLEKULYARNAYA  
GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA  
in Russian No 12, Dec 89 (manuscript received  
17 May 89) pp 44-46

[Article by S. V. Sosnovtsev, A. M. Onishchenko, N. A. Petrov, N. V. Mamayeva, T. I. Kalashnikova, N. A. Perevozchikova, V. N. Ivanyushchenkov, A. N. Burdov and S. K. Vasilenko, All-Union Scientific Research Institute of Molecular Biology, "Vektor" Scientific Industrial Association, USSR Ministry of the Biomedical Industry; "Impuls" State Cooperative Firm, "Vektor" Scientific Industrial Association, Koltsovo, Novosibirsk Oblast; All-Union Scientific Institute of Foot and Mouth Disease, USSR State Agricultural Industry, Vladimir]

[Abstract] Conventional techniques of cDNA synthesis and analysis were utilized to delineate the primary structure of the VP1 gene of the foot and mouth disease virus serotype Asia I. Comparison with other serotypes revealed that the degree of homology between Asia I and A12 is approximately 67 percent, and between Asia I and O1K and C3 is 70 percent. In addition, recognition sites were identified for restriction endonucleases PstI and BsePI. Figures 2; references 8: 3 Russian, 5 Western.

UDC 577.062:579.252:579.841

**Gene Library of Symbiotic Nitrogen-Fixing Rhizobium Lupini**

907C0630E Moscow PRIKLADNAYA BIOKHIMIYA I  
MIKROBIOLOGIYA in Russian Vol 26 No 1,  
Jan-Feb 90 (manuscript received 7 Jun 88) pp 117-120

[Article by A. G. Ivanushkin, G. N. Marchenko, A. Yu. Chistoserdov, A. V. Pushkin and V. L. Kretovich, Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow]

[Abstract] Description is provided of the construction of a *Rhizobium lupini* 359a gene bank, employing plasmid pAYC31. The recombinant plasmid was used for transformation of *E. coli* C6000, resulting in a gene library of 6600 clones. Restriction analysis of the plasmid demonstrated that the size of the average insert was about 6.5 kb, indicating that the probability of encompassing the entire *Rh. lupini* genome was 99 percent. Figures 1; tables 1; references 19: 9 Russian, 10 Western.



UDC 692.43/45.014.426+613.648-07:612.43/45.018

**Endocrine Reactivity to Low-Frequency Continuous and Pulsed Electromagnetic Fields**

907C0484A Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 23 No 6, Nov-Dec 89 (manuscript received 20 Dec 87) pp 4-14

[Article by Ye. A. Zagorskaya]

[Abstract] A literature review was conducted on recent publications dealing with the endocrine aspects of low-frequency continuous (CEMFs) and pulsed electromagnetic fields (PEMFs). Human observations and animal studies have demonstrated that such fields affect the endocrine system directly and indirectly. Under identical conditions of induction and frequency PEMFs exert a more profound biological effect than CEMFs. The sequelae are determined by the effects on the higher levels of the neuroendocrine system and depend on the duration and intensity of exposure and individual susceptibility. The effects may be positive or negative, and the balance between the two underlies the putative therapeutic benefit in certain situations. Relatively little is known, for example, about the effects exerted on the pancreas, but exposure of rats to 20 mT PEMF, 50 Hz, for 1 day has been reported to result in insulin deficiency that persists for two weeks. Most studies on the thyroid gland, on the other hand, indicate stimulation. EMFs have been shown to attenuate the intensity of energetic processes, promote anaerobic glycolysis, alter membrane permeability, and lead to the development of hypoxia in the cells of some tissues. The trigger mechanism for CEMF and PEMF effects involves changes in adenylate cyclase activity, cAMP levels, and secondary messengers. References 126: 72 Russian, 54 Western.

UDC 612.014

**Mechanism of Biological Action of Localized Constant Magnetic Field**

907C0465A Dushanbe IZVESTIYA AKADEMII NAUK TADZHIKSKOY SSR: OTDELENIYE BIOLOGICHESKIKH NAUK in Russian No 2, Apr-Jun 89 (manuscript received 5 Aug 88) pp 77-80

[Article by Ye. G. Aliyeva, Tajik State Medical Institute imeni Abuali Ibn Sino]

[Abstract] In vitro and in vivo studies were conducted with constant magnetic fields to assess potential differences arising in electrolytes as a result of magnetic induction. Model experiments with tubes filled with Ringer-Locke solution and studies with rat jugular vein located between the poles of a horseshoe-shaped magnet with a field strength of about 80-103 A/m induced potential differences of 1-7 mV. The currents thus generated leak into adjacent tissues and may constitute a pathogenetic factor. In addition, within a blood or lymph vessel positively charged ions tend to accumulate in the vicinity of the north

pole and the negatively charged ions accumulate near the south pole of the magnet, while imbalance ions on cell membranes may be expected to alter excitability and permeability, with their attendant physiological sequelae. Figures 4; references 10: 9 Russian, 1 Western.

UDC 612.89.014.426:612.143

**Effect of Single Exposure to 50 Hz Electromagnetic Field on Heart Function and Hemodynamics in Rabbits**

907C0450A Tbilisi IZVESTIYA AKADEMII NAUK GRUZINSKOY SSR: SERIYA BIOLOGICHESKAYA in Russian Vol 15 No 5, Sep-Oct 89 pp 293-301

[Article by T.P. Chitaya and K.Sh. Nadareyshvili, Institute of Physiology imeni I.S. Beritashvili, Georgian SSR Academy of Sciences, Tbilisi]

[Abstract] The cardiac and hemodynamic effects of a therapeutic electromagnetic field (EMF; 50 Hz, 3 mT) were evaluated on 2.5-3.0 kg chinchilla rabbits. The male and female animals were exposed to the EMF for 1 h, employing a cranio-caudal projection of the field vector, with monitoring performed immediately after treatment and at 3 and 24 h thereafter. The resultant data demonstrated improved systolic dynamics, enhanced electrical stability, and accelerated repolarization. In addition, systemic perfusion was improved as a result of an increase in the systolic and minute volumes, systolic index, and reduction in peripheral vascular resistance without any appreciable changes in the heart rate. These changes were regarded as an adaptive response to the physical factor, although the primary trigger mechanisms remain enigmatic. Tables 4; references 20: 18 Russian, 2 Western.

UDC 612.014

**Biologic Response to Electromagnetic Radiation of Radio-Frequency Range**

907C0610B Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 2, Mar 90 (manuscript received 28 Jun 89) pp 506-508

[Article by Yu. P. Chukova, Provisional Scientific Collective "Response", Moscow]

[Abstract] The fundamental reason for the poor reproducibility of results of the effect of radiofrequency range radiation on a test subject was investigated. The two basic reasons for ambiguity of results in these experiments are that the falling energy is usually measured and differs by two times or more from the absorbed energy, and nonthermal alterations are produced by the electromagnetic fields in the test subject. In previous works, researchers were not interested in the specific types of effects they were dealing with. Greatly differing values in experiments were measured on test subjects in most of which the values measured were proportional to the freeenergy rather than the efficiency. The results and conclusions are applicable only to nonthermal isothermic processes induced by radio radiation. Figures 2; references 7: 5 Russian, 2 Western.

UDC 615.33.015.4

### Preparation and Characteristics of Antibiotic-Bearing Liposomes

907C0543E Kiev MIKROBIOLOGICHESKIY  
ZHURNAL in Russian Vol 51 No 6, Nov-Dec 89  
(manuscript received 1 Dec 88) pp 79-83

[Article by K. A. Rotov, V. P. Vasilyev and Yu. V. Antonov, Volgograd Scientific Research Antiplague Institute]

[Abstract] Trials were conducted on the efficiency, stability, and toxicology of liposome-entrapped antibiotics, employing conventionally prepared lecithin:cholesterol:dioleoyl phosphate (7:2:1) liposomes. Preliminary investigations demonstrated that gamma-irradiation in a dose of 500 or 1000 krad ensured sterilization without any damage to the liposomes, whereas a dose of 100 krad was insufficient. In addition, the efficiency of entrapment ranged from 11 to 78 percent, as follows: 78 percent erythromycin, 77 percent tetracycline, 75 percent streptomycin, 71 percent gentamycin, 67.7 percent carbecillin, 67 percent kanamycin and 11 percent levomycetin. Comparative toxicity studies on free and entrapped tetracycline on golden hamsters, employing intramuscular, subcutaneous, and intraperitoneal administration, demonstrated that liposomally-enclosed tetracycline was three to four times less toxic than the free antibiotic. The diminished toxicity was attributed to the slow release of tetracycline, a mechanism that precluded accumulation of toxic concentrations at target sites. Tables 2; references 24: 13 Russian, 11 Western.

UDC 616.002.44:616.002.182:615.275

### Atranes: Possible Mechanisms of Their Effect on Ulcers

907C0626B Moscow IZVESTIYA AKADEMII NAUK  
SSSR: SERIYA BIOLOGICHESKAYA in Russian  
No 1, Jan-Feb 90 (manuscript received 31 Mar 1987)  
pp 67-74

[Article by I. G. Kuznetsov, M. M. Rasulov, M. G. Voronkov, Irkutsk Organic Chemistry Institute, Siberian Division, USSR Academy of Sciences]

[Abstract] The effect of compounds that stimulate the healing of gastric ulcers on the peroxide oxidation of lipids was analyzed to reveal the molecular and cellular mechanisms of the formation of pathologic conditions. Male and female outbred rats weighing 150-180 g with gastric ulcers were treated with 30 mg/kg oxyferriscorbon [sic], 500 mg/kg methyl uracil, 5 mg/kg methyl ethyl (silatrane-1-ilmethyl) sulfonium iodide, 40 mg/kg 1-(chloromethyl) silatrane, or 40 mg/kg 1-(isopropyl) germatrane for 10 days. All of the preparations accelerated ulcer healing, with methyl uracil the least active and 1-(chloromethyl) silatrane being the most active. Peroxide oxidation of lipids is activated in the blood plasma during the development of an ulcer and in the period immediately following, and then

drops and stabilizes at a lower level. Chemoluminescence is used to calculate the intensity of peroxide oxidation of lipids because it reflects the homeostatic condition. Chemoluminescent intensity in the blood increases during stress. Atranes have a pronounced therapeutic effect on ulcers because they are antioxidants. Figures 3; tables 1; references 18: 14 Russian, 4 Western.

UDC 615.217.34.03:[616-099-02:615.285.7].  
015.4:612.82.2].076.9

### Modification of Selective Binding of Muscarinic Antagonists to Brain Membranes in Trichlorfon Intoxication

907C0444A Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 108 No 10, Oct 89 (manuscript received  
20 Feb 88) pp 459-461

[Article by M. B. Predtechenskiy, N. L. Yelayeva and Z. I. Smirnova, Institute of Toxicology, USSR Ministry of Health, Leningrad]

[Abstract] Intramuscular injection of 2 LD<sub>50</sub> doses of trichlorfon to 130-160 g outbred male rats was shown to lead to a two-fold decrease in the maximum binding of quinuclidinyl benzylate to muscarinic receptors in the brain, without affecting the dissociation constant. Furthermore, maximum binding of the muscarinic antagonist cyclosyl [sic] was not affected, but the dissociation constant was increased fourfold. In the presence of the cholinesterase reactivator dipyrroxime baseline dissociation constants were obtained with cyclosyl. These findings demonstrated that trichlorfon competes with the muscarinic antagonists, including presynaptic receptors, for binding sites. These observations may also explain the therapeutic efficacy of combining muscarinic antagonists and cholinesterase reactivators in the management of poisoning with organophosphorus compounds. Figures 2; tables 1; references 11: 1 Russian, 10 Western.

UDC 615.31:547.95:547.943].03:616.13-004.6].076.9

### Synthetic Analogs of Enkephalins as Antiatherogenic Agents

907C0444B Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 108 No 10, Oct 89 (manuscript received  
5 Oct 88) pp 468-470

[Article by G. K. Zoloyev, V. D. Slepushkin, Ye. S. Argintayev, I. A. Prum and G. Ye. Sokolovich, Laboratory of Pathophysiology, Scientific Research Institute of Cardiology, Tomsk Scientific Center, USSR Academy of Medical Sciences]

[Abstract] Experimental and clinical trials were conducted with two synthetic analogs of enkephalin, dalargin and DFEN, to test their putative usefulness as antiatherogenic agents. Studies on 200-250 g male Wistar rats demonstrated that dalargin and DFEN (0.1 mg/kg, intraperitoneally) led to reduction in serum levels of total cholesterol and of the percentage of low-density lipoprotein and very

low-density lipoprotein. In addition, the studies revealed that DFEN was much more potent as a hypocholesteremic agent than dalargin. Studies on 52 male patients with obliterating atherosclerosis of the lower extremities treated with 2 mg/day of dalargin 5 days in conjunction with

conventional management demonstrated a decrease in blood levels of parathormone, cholesterol, and lactate. These findings suggest that synthetic analogs of leu-enkephalin may find use in the treatment of atherosclerosis. Tables 2; references 15: 12 Russian, 3 Western.

UDC 616.98:579.861.2]-036.17-06:616-008.6]-085.31:54 95:547.- 943]-036.8-07:616.12-008.6]-092.4

**In Vitro Effects of Synthetic Analog of Endogenous Opioids of Dalargin on Rat Heart in Experimental Toxemia**

907C0444A Moscow BYULLETEN  
EKSPERIMENTALNOY BIOLOGII I MEDITSINY  
in Russian Vol 108 No 11, Nov 89 (manuscript received  
12 Feb 89) pp 533-536

[Article by S. B. Pashutin, Experimental Laboratory,  
Institute of Surgery imeni A. V. Vishnevskiy, USSR  
Academy of Medical Sciences, Moscow]

[Abstract] Heart perfusion studies were conducted to assess the effects of dalargin, a synthetic analog of leu-enkephalin, and staphylococcal  $\alpha$ -toxin, in order to identify an additional therapeutic use for dalargin. The heart preparations were derived from 230-250 g male Wistar rats. Perfusion with a  $8 \cdot 10^{-5}$  Lh  $\alpha$ -toxin concentration enhanced the pumping efficiency of the heart. However, a further increase in concentration to  $16 \times 10^{-4}$  Lh had an adverse effect on cardiac performance and resulted in bradycardia, while a  $8 \times 10^{-4}$  Lh concentration led to cardiac arrest. Perfusion with  $5 \cdot 10^{-5}$  M dalargin prior to toxin perfusion did not modify the effects of the toxin, nor did dalargin affect heart function in that concentration. The effects of the toxin were diminished, although not fully abolished, when followed by dalargin perfusion. The data were interpreted to indicate that a certain degree of cardiac pathology has to be present for dalargin to exercise a beneficial effect. Tables 2; references 16: 10 Russian, 6 Western.

UDC 612.55.06.612.223.11

**Human Thermoregulatory Response to Moderate Hypercapnia**

907C0484G Moscow KOSMICHESKAYA BIOLOGIYA  
I AVIAKOSMICHESKAYA MEDITSINA in Russian  
Vol 23 No 6, Nov-Dec 89 (manuscript received  
22 Mar 88) pp 51-54

[Article by L. N. Mukhamediyeva, V. P. Savina and Ye. I. Nikitin]

[Abstract] Human thermoregulatory response to moderate hypercapnia was investigated on 20 male volunteers 20-45 years old subjected for 40 days to an atmosphere of 1.1-1.6 percent carbon dioxide and 19-20 percent oxygen at 21-23°C and 50-70 percent humidity. Control data were derived from ten males exposed to 0.2-0.4 percent carbon dioxide in the air. The data showed that a slight decrease in body temperature in the experimental subjects was noted after 3 days, but the temperature did not fall below the control baseline until day 32. At that time a fall of 0.5°C was noted from 37.0 to 36.5°C. The gradual decrease in body temperature was accompanied by reduction in blood lactate ( $r = +0.79$ ) and compensated respiratory acidosis, suggesting that

hypercapnia exerted a slight inhibitory effect on glycolysis and, hence, ATP production. Figures 1; tables 2, references 20: 13 Russian, 7 Western.

UDC 575+612.821.6+615.361.814.3

**Effects of ACTH<sub>4-10</sub> On Some Forms of Adaptive Behavior in Mice of Various Genetic Groups**

907C0476A Moscow ZHURNAL VYSSHEY  
NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA  
in Russian Vol 39 No 6, Nov-Dec 89 (manuscript  
received 18 Jul 88; after revision 12 Apr 89)  
pp 1048-1055

[Article by V. V. Voznesenskaya and I. I. Poletayeva,  
Institute of Evolutionary Morphology and Ecology of  
Animals imeni A. N. Severtsov, USSR Academy of  
sciences, Moscow; Moscow State University imeni M. V.  
Lomonosov]

[Abstract] An analysis was conducted on genetic factors in modifying behavioral effects of ACTH<sub>4-10</sub> in mice. Accordingly, ACTH<sub>4-10</sub> modification of feed procuring behavior was assessed in CBA/Lac/Sto (CBA) mice, C57BL/6J (B6) mice, and an outbred line of mice with an 8/17 Robertsonian translocation (TIIEM), in U- and radial mazes. Ability to extrapolate when the location of feed was shifted was also assessed. Intraperitoneal administration of ACTH<sub>4-10</sub> in a dose of 40  $\mu$ g/kg improved this form of behavior in each of the three species in the relatively simple U-maze tests, with the TIIEM mice being especially affected. In the more complex radial maze, learning was facilitated in the TIIEM mice, deteriorated in the CBA mice, and was essentially unaffected in the B6 animals. In control studies TIIEM mice were classified as fast-learners and CBA mice as slow learners. Similar results were obtained in extrapolation studies where the performance of TIIEM animals was somewhat improved and that of CBA mice was adversely affected. Finally, treatment with exogenous ACTH<sub>4-10</sub> also reduced the incidence of 'refusals.' Administration of 1  $\mu$ g/kg into the lateral cerebral ventricles had slightly more profound effects. These observations again underscore the importance of genomic factors in determining the endocrine basis of behavior. Figures 2; tables 1; references 16: 7 Russian, 9 Western.

UDC 612.821.6+612.8.015

**Lateralized Effects of Arg-Vasopressin on Hypothalamic Self-Stimulation in Rats**

907C0476C Moscow ZHURNAL VYSSHEY  
NERVNOY DEYATELNOSTI IMENI I. P. PAVLOVA  
in Russian Vol 39 No 6, Nov-Dec 89 (manuscript  
received 5 May 88; after revision 17 Feb 89)  
pp 1155-1156

[Article by G. A. Varetanyan, T. M. Makarova, A. A. Lebedev, Ye. I. Varlinskaya, Ye. S. Petrov and B. I.



Klementyev, Institute of Experimental Medicine, Academy of Medical Sciences, Leningrad]

[Abstract] Electrophysiological studies were conducted on 250-300 g outbred male rats to determine the effects of arg-vasopressin (AVP) on hypothalamic self-stimulation. Administration of AVP into the lateral cerebral ventricles in a dose of  $10^{-11}$ g enhanced self-stimulation of the left lateral hypothalamic nucleus to a statistically significant degree without affecting the frequency of stimulation of the right lateral hypothalamic nucleus. Lower doses of AVP ( $10^{-12}$  to  $10^{-13}$ ) had no selective effect. Accordingly, the data indicate that AVP exerts a dose-dependent unilateral regulatory action on paired brain formations. Figures 1; references 5: 4 Russian, 1 Western.

UDC 611.441-018.74:591.415

#### Effects of Hypokinesia on Transport Function of Thyroid Capillary Endothelium

907C0464A Yerevan KROVOBRASHCHENIYE in Russian Vol 22 No 5, Sep-Oct 89 (manuscript received 14 Apr 88) pp 44-46

[Article by L. I. Polyanskaya, G. A. Alimov and A. A. Mironov, Ivanovo Medical Institute imeni A. S. Bubnov; Second Moscow Medical Institute imeni N. I. Pirogov]

[Abstract] Outbred albino rats were subjected to hypokinesia for 120 days in order to assess changes in the fenestrated endothelium of thyroid capillaries in relation to thyroid function. Electron microscopy and cryofractographic observations showed a time-related reduction in the number of capillaries and thyroid atrophy, indicative of diminished endothelial permeability. However, by the 120th day evidence was obtained of a compensatory response in the form of an increase in the area of the endothelial cells.

UDC 612.58

#### Changes in Serotonin Levels in Peripheral Tissues During Artificial Hypothermia and Hibernation

907C0487A Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKIKH NAUK in Russian No 3, Dec 89 (manuscript received 3 Nov 88) pp 69-72

[Article by K. V. Svechnikov and N. K. Popova, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] An analysis was conducted on the status of the serotonergic system in rats subjected to artificial hypothermia (20°C) and hibernating gophers (*Citellus erythrogenys major*) in order to assess the role of serotonin in thermoregulation. The results demonstrated that in the hibernating gophers with a body temperature of 20°C a significant fall (63 percent) in serotonin occurred only in the blood and was attributed to the fall in thrombocyte counts. Serotonin levels in the gastrointestinal tract,

spleen, and lungs were not significantly affected. In the case of the Wistar rats artificial hypothermia induced a 27 percent reduction in blood levels of serotonin due to a moderate reduction in the thrombocyte count, and a 39 percent reduction in the gastrointestinal tract. Splenic and pulmonary levels were not appreciably affected. The key difference between the two species consisted of a marked reduction of gastrointestinal serotonin in the rat, a system that serves as the major depot of serotonin in the body. The data were indicative of adaptive mechanisms in the rat designed to counteract the hypothermic effect of serotonin, and in the gophers of promoting hypocoagulability and hypothermia. Tables 2; references 15: 6 Russian, 9 Western.

UDC 612.886+612.858:612.84

#### Changes in Vestibular Postural Responses Determined by Visual Feedback Information

907C0625B Kiev NEYROFIZIOLOGIYA in Russian Vol 22 No 1, Jan-Feb 90 (manuscript received 26 Apr 89) pp 80-87

[Article by B. N. Smetanin, K. Ye. Popov, and V. Yu. Shlykov, Institute of Information Transmission, USSR Academy of Medical Sciences, Moscow]

[Abstract] Changes in vestibulomotor response depending on visual feedback while standing were studied using 12 men and women aged 30-45. Single impulses 1.0-2.5 mA in amplitude and lasting 1-2 seconds each were used. Visual feedback has a slight effect on the vertical pose, but its influence is enhanced if the eyes record information that upsets the spatial orientation. The early and late phases of the vestibulomotor reaction vary in magnitude depending on visual control with the greater response recorded with closed eyes and lesser responses recorded when eyes were open or staring at a fixed object. Visual control affects the late phase of the vestibular pose response more occurring 200-500 msec after vestibular stimulation. Only visual signals that inform the body of its spatial position can substantially affect the vestibulomotor reaction. Changes in the vestibulomotor response are greater the more precise and complete the visual information about the spatial position of the body. The early and late phases of the vestibulomotor reaction are independent components that are mediated by regulatory mechanisms. The late component helps compensate for positional changes caused by vestibular stimulation. Figures 4; references 20: 4 Russian, 16 Western.

UDC 591.089:612.8

#### Autotransplantation of Adrenal Medulla into Cervical Neurovascular Fascicle. Part 1.

907C0602B Minsk IZVESTIYA AKADEMII NAUK BSSR: SERIYA BIOLOGICHESKIKH NAUK in Russian No 1, Jan-Feb 90 (manuscript received 27 Jun 89) pp 111-114

[Article by D. M. Golub, I. I. Novikov and S. V. Trikhmanenko, Institute of Physiology, Belorussian Soviet Socialist Republic Academy of Sciences]



[Abstract] Studies on fetal cats were conducted to determine the feasibility of creating a self-replenishing depot of catecholamines in the vicinity of the central nervous system, employing transplantation of adrenal medullary tissue into pockets of cervical neurovascular fascicles. Fluorescent microscopy and histologic data demonstrated positive results in eight of thirteen trials, with the chromaffin cells remaining viable for 2-3 months after transplantation with retention of normal morphology. Should this technique find clinical applicability, it may well serve as a novel therapeutic approach to Parkinson's disease that could obviate neurosurgical intervention. Figures 3; references 9 (Russian).

UDC 612.81:612.813:612.8.015

**Regeneration of Rat Peripheral Nerves in Transcranial Electrostimulation of Opioid Structures in Brain**

907C0625A Kiev NEYROFIZIOLOGIYA in Russian  
Vol 22 No 1, Jan-Feb 90 (manuscript received  
19 Apr 89) pp 76-79

[Article by G. N. Akoyev, O. B. Ilinskiy, L. I. Kolosova, V. P. Lebedev, V. D. Avelev, and O. G. Petrov, Physiology Institute imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] Exogenous administration of opioids to animals with peripheral nerve damage has demonstrated that opioid peptides accelerate the reparation of nerve damage. Transcranial electrostimulation of the antinociceptive structures in the brain stem that accelerate the release of endogenous opioid peptides was employed on 200-250 g male rats to study its effect on the regeneration of nerve fibers. The sciatic nerve was dissected and reconnected microsurgically. An 0.8 mA direct current and a 0.4 mA pulsed current at a frequency of 70 per second and lasting 3.0-3.5 msec each were used. The first sign of motor function restoration was noted in the experimental group by day 5, but not until day 9 in the control group. The first impulse reaction to serious mechanical irritation was noted by day 14 in the experimental group and day 19 in the control group. Transcranial electrostimulation accelerates reinnervation of motor nerve fibers in the foot by 30 percent, and sensory nerve fibers by 25 percent by activating the antinociceptive system of the brain and increasing the concentration of opioid peptides in the cerebrospinal fluid and blood. Transcranial electrostimulation is recommended for treating peripheral nerve damage and is already being used clinically as an analgesic. Figures 3; references 12: 10 Russian, 2 Western.

**BAM Public Health Problems**

907C0169E Moscow *MEDITSINSKAYA GAZETA*  
in Russian 13 Sep 89 pp 2

[Article by A. Lebedev, chief, Department of Traumatology and Orthopedics, Railroad Hospital, Tynda]

[Abstract] The BAM is increasingly and perhaps justifiably thought of as a symbol of the years of stagnation, but tens of thousands of people continue to work on the great railroad. The health care sector along the road is experiencing particular difficulties as a result of its being financed by the old principles. The social infrastructure of settlements along the line, planned and designed by the cold hand of bureaucracy, have little to offer in the way of health facilities. There is nothing more permanent than a temporary structure—this is true along the BAM everywhere. The shortage of ambulatory polyclinic institutions will amount to over 4,000 patient visits per shift by the year 2000. The BAM is a reality which demands a well thought-out and realistic economic approach. Public health is not the place to save money.

**Drug Abuse of Pervitin and Ephedrine Derivatives**

907C0169F Moscow *MEDITSINSKAYA GAZETA*  
in Russian 13 Sep 89 pp 3

[Article by G. Lukacher, National Science Center of Narcology, A. Vrublevskiy, N. Laskova, M. Rokhlina]

[Abstract] A briefing of 5 Sep 89 concerning drug addiction reported activation of Ministry of Internal Affairs forces in the war against drugs. Stricter control of the prescription and storage of narcotics has forced addicts to search for new preparations and mixtures, particularly those which can be easily made. This article discusses preparations of ephedrine and pervitin [methylamphetamine]. Illegally manufactured drugs are of unknown purity and strength, and may contain toxic substances. These include ephedron, which has been declared a narcotic substance by special order of the USSR Ministry of Health. Ephedron addiction begins at an early age. The symptoms of acute intoxication include clinical manifestations of intracranial hypertension. A rapid increase in tolerance develops among addicts, and abstinence syndrome can develop after as little as three months of regular use, featuring massive depression rather than the pain syndrome typical of opiate addiction. Diffuse encephalomyelitis develops, leading in many cases to invalidism. Use of large quantities with long-term lack of sleep can result in the development of specific psychoses with paranoia, panic, disorientation and rudimentary auditory hallucinations. Pervitin [methylamphetamine] is also illegally made and can cause psychological dependence after the first use. Partial tolerance develops, so that dosage does not increase greatly over time. Suggested treatment to ease withdrawal and additional recommended literature are presented. The editors note that a year or two ago, an article such as this could not have been published.

**Health Ministry Collegium**

907C0169B *MEDITSINSKAYA GAZETA* in Russian  
No 120 (4981), 06 Oct 89

[Abstract] The collegium of the USSR Public Health Ministry has recently discussed the program for development of the first Moscow Medical Institute imeni Sechenov. The institute has served as the basis for creation of a teaching methodology association for higher medical education and the introduction of new forms of organization of the educational process. The institute is seeking new financing methods, but its program is being hindered by the lack of materials and equipment. The collegium also studies the question of the International Classification of Diseases, Injuries and causes of death, approving the form suggested by the World Health Organization. A set of new standards and methodological documents has been developed defining the sequence, methods and conditions of further development of the health service profession intended to introduce new principles of financing. A transition is planned from primarily industry-wide to primarily territorial management. Local councils of peoples deputies and public health organizations will control most of the resources, while retaining the Soviet principle of free medical treatment for all citizens. New institutions are being organized—territorial medical associations, including polyclinics, hospitals, first-aid stations and other institutions. Successful transition of public health to the new financing conditions will require organization of educational meetings and seminars, analysis of the results of activity of public health institutions and solution of the priority problem of Soviet public health—the transition to preventive medical practices.

**Mass Pesticide Poisoning**

907C0005 Moscow *MEDITSINSKAYA GAZETA*  
in Russian 20 Sep 89 p 2

[Article by A. Vladimirtseva, *MEDITSINSKAYA GAZETA* correspondent, Sverdlovsk Oblast, under the rubric "A Strange Occurrence": "Onion Grief: What Happened With Students at Harvest"]

[Text] We had just observed the anniversary of an extraordinary event in Chernovtsy when life threw in another bitter surprise that caused at least as much alarm, if not more. In Krasnoufimskiy Rayon, Sverdlovsk Oblast, a strange mass disease appeared among students at Ural State University who were harvesting onions.

As noted in the final document after a careful check of what had happened, "various forms of a disease of the peripheral nervous system were identified in the students....The combined, associated effects of a complex of pesticides entering the body through respiratory organs and the skin and with food products were the cause of the disease...."

Once again, not for the first time, children and young people are paying for the criminal negligence of adults, because 26 out of the 50 hospitalized individuals are minors, yesterday's school children. A total of 574 students have worked on the contaminated fields of two sovkhoz departments—Podgornoye and Pridannikovo—and no one can give a guarantee now that new people will not be added to the 50 who have fallen ill. The gross violations the commission noted in stock-taking and storage rules and in regulations concerning the application of toxic chemicals on the Krasnoufimskiy Sovkhoz attest to the fact that all those who were afflicted were victims of the criminal negligence of sovkhoz workers (the procurator who is now conducting an investigation will give a more accurate legal evaluation). The farm managers did try to demonstrate that the onion fields were treated in May with ramrod only and that no other pesticides were used on those fields. However, it has been established that both the soil and the onions contain malathion, phosphamide, simbush [tsimbush], and sumicidine and that concentrations of pyrethroids in the soil exceed allowable limits 4- to 5-fold, and on some plots concentrations of ramrod exceed allowable limits 10- to 20-fold and, in places, even 120-fold.

It should be stated that pesticide content was found to exceed all allowable levels in the environment 30-40 days after chemical treatments. One can imagine what was going on there during the treatment itself and on the second and subsequent days if, right on the fields, the machine operators themselves prepared the solutions without any supervision from specialists. Furthermore, the sovkhoz also used preparations whose application was completely prohibited—such as tolaphos [tolafos] and phazolon [fazolon], for example. Areas with fodder root crops were treated with them (but it was not recorded in the report documentation). What gross ignorance one must have in order to prepare products with such a toxic seasoning for the tables of Ural residents, ignoring the warnings of ecologists and other specialists!

The students felt the effect of this "seasoning" as early as one or two days after beginning work. Reduced sensitivity in the extremities and numbness in them were the first signs of trouble. And this, despite the fact that the kids worked in gloves and boots. The alarm was sounded right away. Medical aviation, the sanitary and epidemiological service, and combined teams of physicians from out of town became involved in the case. Specialists from various corners of the country—neuropathologists, hygienists, chemists, toxicologists, and infectious-disease experts—began to gather in Sverdlovsk. They worked through one scenario after another. A viral infection? A radiological background? The effects of heavy metal salts? Poisoning with toxic chemicals?

Along with Sverdlovsk physicians and scientists, 20 newly arrived minds racked their brains over the "onion" riddle—the first such case not only in Soviet practice, but also in world practice. The levels and names of commissions changed. The final commission—a joint

commission of the USSR Ministry of Health and other Union departments—was headed by V. I. Chiburayev, the country's deputy chief health officer.

More than once was heard the valid phrase that it is easier for the last than it is for the first to draw a conclusion. That's true. Therefore, specialists can hardly be reproached for the errors they made and the incorrect scenarios. However, it is impossible not to mention one error that was due either to considerations of the moment, or to an underestimation of what had happened, or simply to presumption. It concerns the speech by V. V. Klebanova, the oblast's chief toxicologist, which was given before students and parents at the university not long before the prospective dispatch of a new group of kids to Pridannikovo and Podgornoye (the first group, which arrived on 4 August, was evacuated 12 days later). It was her assurances about the toxicological safety of fields, along with the permission of the local plant protection station, that made it possible to send the second group of students to the sovkhoz, and soon after, 20 of the newly arrived people were hospitalized with the same diagnosis.

Meanwhile, it would be much more correct to be overly cautious than to underestimate what had happened. And that goes for the determination of the prognosis of the disease, too, because the students themselves and their relatives are most of all disturbed by the following question: What will happen next? Intensive therapy in Sverdlovsk hospitals improved the patients' condition markedly. On the whole, the prognosis is favorable.

However, somewhat earlier, A. P. Dorogiy and V. V. Antonyuzhenko, doctors of medical science from Kiev and Gorkiy, wrote that they noted in a number of patients a tendency toward the development of a neurotoxic process of the ascending type even after the contact with toxic chemicals had ceased. If there is a contradiction here, let specialists decide. However, as far as I am concerned, in this case, anxious guardedness is preferable to a calming absolute.

We talked in detail with A. P. Dorogiy, whose opinion is especially important, since he is the head of the Department of Clinical Pathology at the All-Union Scientific Research Institute of Hygiene and Toxicology of the USSR Ministry of Health (where, incidentally, the children from Chernovtsy were also treated). Scientists at that institute specialize in the study of pesticides and, most likely, have a clearer idea than others of the mechanism of the pesticides' destructive effects—short-term and long-term—on the human body.

And since this dramatic incident has happened, as many lessons as possible should be drawn from it. And not only by Ural residents. Since it was mainly freshman girls who got sick—that is, those who were a little younger and a little weaker—it is natural for questions to come up. How long will higher educational institutions continue to send minors to gather the harvest? How much longer

will medical examinations of students before their dispatch to kolkhozes be performed as little more than formalities? As applied to the specific Sverdlovsk situation, a third question is begging for an answer: Can the eight years of red tape associated with the construction of an inter-university polyclinic be considered normal?

Of course, now, when this incident has received such scandalous publicity, resources, opportunities, and funds will be found not only to complete the cure of those who have fallen ill, and to feed and encourage them, but also to set up long-term medical observation of them, as well as to consciously examine all students who have taken part in agricultural work. However, should we console ourselves with the fact that the errors made have been rectified? To decisively prevent them in the future is no less important, and perhaps is more important. That is why the commission suggests that the USSR State Committee for Vocational and Technical Education [Goskomobrazovaniya SSSR], the USSR State Committee for Labor and Social Problems, and the All-Union Central Council of Trade Unions determine once and for all the procedure for enlisting pupils and students in agricultural work.

All those who were involved in the incident in Krasnoufimskiy Rayon, or who simply heard about it, cannot but be interested in another question: What happened to the poisoned onions? It turned out that after the evacuation of the second group of students, pensioners were invited to the fields and were promised...the sale of scarce sugar. Consequently, sooner or later the ill-fated onions will get to our tables. But there is no one to protect the consumer: the network of laboratories for monitoring the content of residual amounts of pesticides and nitrates in agricultural products is too weak, and, alas, our health services are powerless to stand up to this heap of poison.

What then is the solution? Specialists who have investigated the case in the Sverdlovsk Oblast feel that the answer is for the USSR Supreme Soviet to immediately, and on an emergency basis, adopt a law on the use of pesticides and for scientific research on the overall effect of chemicalization agents on people's health to be developed. For the time being, however, it is impossible to predict what extraordinary events "assortments of pesticides" will result in tomorrow.

### Self-Financed Clinic Described

907C0169A *MEDITSINSKAYA GAZETA* in Russian  
No 120 (4981), 6 Oct 89

[Interview by *MEDITSINSKAYA GAZETA* correspondent with L. F. Zolotareva, deputy chief physician at the self-financed clinic in the Irkutsk Oblast Hospital]

[Abstract] A self-financed polyclinic created on the basis of the oblast clinical hospital has been in operation in Irkutsk for over a year, treating about 150,000 city and rural residents and generating 98,000 rubles of income.

This interview with L. F. Zolotareva, the deputy chief physician of the oblast hospital for the self-financed polyclinic, discusses its operation. A great deal of volunteer time is given by the workers, and up to 50% of the income of the polyclinic is dedicated to the purchase of new equipment, which is said to be in very short supply. The polyclinic is a subdivision of the oblast hospital. The polyclinic hopes to start treating tourists so that it can be paid in hard currency. It is making contact with a number of foreign firms to attract foreign tourists.

### Medical Construction Funds Not Assimilated

907C0169G *Moscow MEDITSINSKAYA GAZETA*  
in Russian 8 Sep 89 p 1

[Article by Yu. Ishmayev, under the rubric "Column on the Topic of...": "Money They Don't Need?"]

[Abstract] All-Union Communist subbotniks [designated Saturdays on which labor is donated] in the past year accounted for 318 million rubles of work toward the construction of treatment-and-prevention institutions. However, these donations have not been well utilized—for example, only 16% of the maternity hospitals slated for construction during a six-month period are in operation. The disparity between the funds allocated and their use by the construction industry is obvious. In the next five-year plan, when state investment in public health will triple, the capacity of the construction industry will hardly increase by the same proportion. The situation might improve if the funds available were given over to cooperative and contract construction organizations, or invested in enterprises for the manufacture of medical equipment and medications.

### New Ambulatory Treatment System Discussed

907C0169C *Moscow MEDITSINSKAYA GAZETA*  
in Russian 6 Oct 89 pp 2

[Article by N. P. Poddubnyy]

[Abstract] The author discusses the operation of a specialized ambulatory treatment institution in Krasnodar. The administrative and financial support of the center is provided by the hospital, while organizational and methodological leadership is provided by the SKAL National Scientific-Practical Association. The three centers of the complex in Krasnodar, specializing in pulmonologic, gastroenterologic and neurologic ambulatory treatment, have treated 1,851 patients in the first half year of operation, only 273 of which received individual periods of hospital treatment, while one-third were briefly hospitalized for more intensive therapy and complex examinations. Some 80% of the patients have improved. A center is considered the equivalent of a hospital, and its patients are listed in the official statistics as ambulatory hospital patients. Inquiries have been received from other cities concerning the opening of centers in the SKAL system.



UDC 575.224.46

**Small Doses of Ionizing Radiation and Inducible  
Reparation System**

907C0610A Moscow DOKLADY AKADEMII NAUK  
SSSR in Russian Vol 311 No 2, Mar 90 (manuscript  
received 17 Jul 89) pp 481-484

[Article by L. G. Dubinina, Z. I. Kurashova, I. V. Volkova, and N. P. Dubinin, Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow]

[Abstract] Many organisms, including man, are constantly subjected to small doses of ionizing radiation. The question of how small doses of ionizing radiation induce an antimutation reparation system was investigated using cells of the meristem of *Crepis capillaris* rootlets and the following radiation parameters: 1.7 Gr/min, 190 kV, and 15 mA current. The nonmutagenic doses used for pretreatment were 0.25 and 0.125 Gr, followed 2 h later by acute radiation doses of 2.5, 5, 10, and 25 Gr. The cells were fixed 10, 12, 14, and 18 h later. Pretreatment radiation was not effective at radiation doses of 10 or 25 Gr, or in longer periods of fixation. There is a system of inducible reparation that protects cells from acute radiation doses for short cellular cycles following irradiation with 2.5 and 5 Gr X-rays and 10 Gr gamma rays. There is no inducible reparation for longer cellular cycles, but there is the constitutive system of reparation. Ionizing radiation produces single- and double-stranded breaks in the DNA. Alkylating compounds then join carbohydrate radicals to bases, indicating that antimutation inducible reparation is distinct

from the "adaptive response" system. This protective effect is probably due to excision and post-replicative reparation enzymes. Figures 2; references 15: 5 Russian, 10 Western.

UDC 616.006.02.009.097

**Change in Number of Chromosomal Aberrations  
Induced by X-Ray Irradiation in Cells Affected by  
Fruglumin A**

907C0613A Minsk DOKLADY AKADEMII NAUK  
BSSR in Russian Vol 34 No 4, Apr 90 (manuscript  
received 4 Nov 89) pp 368-371

[Article by G. V. Kraskovskiy, A. A. Rakityanskaya, G. I. Mironova, and L. V. Gorobets, Genetics and Cytology Institute, Belorussian Soviet Socialist Republic Academy of Sciences]

[Abstract] Fruglumin A, an antimutagenic substance, is a natural polysaccharide that is a biogenic stimulator of a natural immunologic reaction. It accelerates regeneration and stimulates hemopoiesis. Mice were irradiated with 2.7 Gr, 180 kV, with a 5 mA current and administered 0.5 ml of fruglumin A intraperitoneally to study the number of chromosomal aberrations in their bone marrow cells induced by X-ray irradiation. Fruglumin A administration prior to irradiation had no effect, while two injections of fruglumin A the first day following irradiation decreased the frequency of chromosomal aberrations and the number of aberrations per cell by two times. Fruglumin A stimulates reparation of the aberrations caused by the ionizing radiation. Tables 2; references 12: 11 Russian, 1 Western.



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### **Recovery of Recombinant Polioviruses from Poliomyelitis Patients**

907C0506A Moscow MOLEKULYARNAYA GENETIKA, MIKROBIOLOGIYA I VIRUSOLOGIYA in Russian No 11, Nov 89 (manuscript received 2 Mar 89) pp 14-20

[Article by O. K. Kutitova, G. Yu. Lipskaya, S. V. Maslova and V. I. Agol, Interfaculty Scientific Research Laboratory imeni A. V. Belozerskiy, Moscow State University imeni M. V. Lomonosov; Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow Oblast]

[Abstract] Poliovirus isolates from pediatric cases of paralytic poliomyelitis were tested for recombinant strains in order to assess the occurrence of recombination under natural conditions. None of the four patients (9 to 29 months old) had been vaccinated, but had been in contact with vaccinated individuals. Oligonucleotide mapping studies on the four isolates from fecal specimens subsequently grown in RD cells revealed recombinant strains. The 5'-end of the isolates was found to be derived from type 2 virus. In two of the isolates the 3'-end was derived from type 1 virus and in two others from type 3 virus. In addition, the four isolates also exhibited several point mutations. The question of whether recombination contributed to the virulence of the isolates remains open. Figures 3; tables 7; references 12: 2 Russian, 10 Western.

UDC 616-092:612.017.1.064]-022.7:578.828.6]-06:616.36

### **Liver Damage in AIDS Patients**

907C0454A Moscow KLINICHESKAYA MEDITSINA in Russian Vol 67 No 11, Nov 89 (manuscript received 17 Mar 89) pp 44-47

[Article by A. G. Rakhmanova, V. K. Prigozhina, A. V. Smirnov, V. A. Isakov, N. I. Stavitskiy, B. V. Stukov and V. N. Kropachev, Chair of Infectious Diseases with a course on Laboratory Diagnosis of AIDS, Leningrad

Institute of Advanced Training of Physicians imeni S. M. Kirov; City Infectious Hospital No 30 imeni S. P. Botkin]

[Abstract] Biopsy studies in conjunction with clinical chemistries were performed on 7 AIDS patients in order to further define hepatic damage in HIV infections. The cohort consisted of male and female patients ranging in age from 25 to 44 years, with hepatomegaly manifested in five of the subjects. The findings revealed depressed albumin levels, moderate cytolysis, cholestasis, and moderate inflammatory changes. In addition, examination of specimens obtained from an autopsy revealed more advanced stages of dystrophy and intralobular and portal infiltration. Accordingly, the data indicate that liver function tests should be performed on AIDS patients as part of the management routine. Tables 1; references 16: 2 Russian, 14 Western.

UDC 612.017.1

### **Potential Means of Diagnosing and Treating AIDS With Low Molecular Weight Non-Peptide Substances That Specifically Block CD4 Lymphocyte Receptor and gp120 Virus Receptor**

907C0626C Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 1, Jan-Feb 90 (manuscript received 20 Jun 89) pp 133-136

[Article by L. A. Piruzyan, I. Ye. Kovalev, and V. A. Dementyev, Chemical Physics Institute, USSR Academy of Sciences, Moscow]

[Abstract] The problem of using low molecular weight membranotropic substances that block human immunodeficiency virus from the target cell has already been examined. A means of preventing AIDS by specifically blocking the CD4 T-lymphocyte from contact with the gp120 glycoprotein virus capsid is being researched. This is the key, because if the virus cannot penetrate into the cell, it cannot cause the disease to develop. Several specific means of solving the problem of finding a non-peptide receptor substance have been suggested. The specific ligands, if they can be found, may be used in a way that they will irreversibly bind with the receptor. References 12: 9 Russian, 3 Western.

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